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İKİ PARAMETRELİ ELASTİK ZEMİNE OTURAN SONLU KİRİŞ ELEMAN İÇİN GENEL BİR RİJİTLİK MATRİSİ ve TESİR ÇİZGİLERİ

YÜKSEK LİSANS TEZİ

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ÖNSÖZ

Bu çalısmada, iki parametreli elastik zemine oturan sonlu kiriş elemanların, statik, dinamik ve burkulma hesabında kullanılabilen genel bir rijitlik matrisi ve tesir fonksiyonları elde edilmiştir.

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İÇİNDEKİLER

ÖZET

Bu çalışma iki bölümden oluşmaktadır. Birinci bölümde iki parametreli elastik zemine oturan sonlu kiriş elamanın statik, dinamik ve burkulma hesabında kullanılabilen genel bir rijitlik matrisi elde edilmiş, ikinci bölümde ise aynı kiriş elemanın tesir çizgilerini çizebilmek için gerekli olan tesir fonksiyonları bulunmuştur.

Rijitlik matrisi çıkarılırken, problemin diferansiyel denkleminin homojen çözümüne ait karakteristik denklemin kökleri kompleks ve-veya gerçel degişkenler olarak alınmıştır. Bu kökler kullanılarak uç kuvvetlerinin uç yer değiştirmeleri cinsinden ifadeleri, rijitlik matrisini sayısal olarak bulabilecek şekilde elde edilmiştir.

Tesir fonksiyonlarının bulunmasında, diferansiyel denklemin homojen çözümüne ait karakteristik denklemin kökleri trigonometrik ve hiperbolik fonksiyonlar olarak bulunmuştur. Bu kökler yardımıyla, başlangıç parametreleri yöntemi kullanılarak tesir fonksiyonları bulunmuştur. Başlangıç parametreleri sınır şartlarından elde edilmiştir. Bulunan bu ifadeler, bilgisayar programında kullanılarak tesir çizgisi tabloları elde edilmiştir.

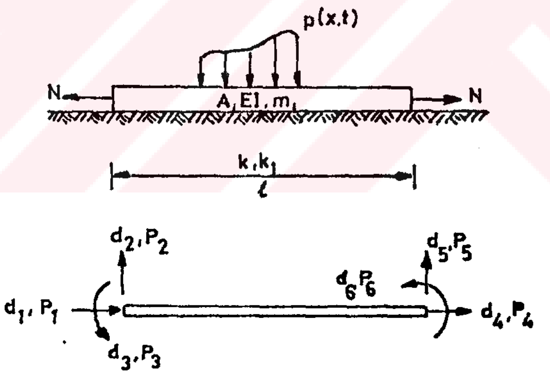
SUMMARY

A GENERAL STIFFNESS MATRIX AND INFLUENCE LINES FOR BEAMS RESTING ON TWO PARAMETER ELASTIC FOUNDATION

This study has two parts. In the first part of study, a general stiffness matrix for static, dynamic and buckling analysis of the beam element resting on two parameter elastic foundation is obtained. And the second part of the study, influence functions for influence lines of beams resting on two parameter elastic foundations is obtained.

A GENERAL STIFFNESS MATRIX FOR BEAMS RESTING ON TWO PARAMETER ELASTIC FOUNDATION

A beam element in figure which has l length and six degrees of freedom at two ends.



First, (4*4) stiffness matrix which consider 2., 3.,5., and 6. freedoms is obtained. Then, it widen to (6*6) stiffness matrix with 1. and 4. freedoms.

The differantial equation of beam resting on two parameter elastic foundation:

$$EIy^{(IV)} - (k_1 + N)\, y'' + ky = -(m_1 + m_0)\, \frac{\partial^2 y}{\partial t^2}$$

Here;

- y : Vertical displacement of beam
- EI : Stiffness of beam
- k : 1. foundation modül
- k_1 : 2. foundation modül
- m_1, m_0 : Respectively mass of beam and foundation

The characteristic equation of this differantial equation is obtained with $w=e^{mx}$. The roots of characteristic equation may be reel and-or imaginary. The roots are shown m_1, m_2, m_3, m_4.

Elastic curve of beam:

$$w=A_1 e^{m_1 x}+A_2 e^{m_2 x}+A_3 e^{m_3 x}+A_4 e^{m_4 x}$$

This equation is writen matrix form: w=[G][A]
Here; [A] otained from $d_2=w(0)$, $d_3=w^{/}(0)$, $d_5=w(l)$, $d_6=w^{/}(l)$ boundary conditions dependent d_2, d_3, d_5, d_6. Shape functions are obtained with using matrix [A].

[d]=[B][A]   [A]=inv[B][d]

w=[G]inv[B][d]=[N][d]

[N] : Shape functions.

The (4*4) stiffness matrix is obtained from differantial equations of shear force and bending moment and degrees of freedom matrix [P].

$$V=-EI\left[\frac{d^3w}{dx^3}-2r^2\frac{dw}{dx}\right] \qquad M=-EI\frac{d^2w}{dx^2}$$

$$[P]=\begin{bmatrix}P_2\\P_3\\P_5\\P_6\end{bmatrix}=\begin{bmatrix}(V)_{x=0}\\-(M)_{x=0}\\-(V)_{x=l}\\(M)_{x=l}\end{bmatrix}$$

$$[P]=[C][A]=[C][B]^{-1}[d]$$

The (4*4) stiffness matrix:

$$[S_1] = [C]\,[B]^{-1}$$

This (4*4) stiffness matrix widen to (6*6) matrix with 1. and 4. freedoms. And (6*6) general stiffness matrix:

$$[S] = \begin{bmatrix} \frac{AE}{l} & 0 & 0 & -\frac{AE}{l} & 0 & 0 \\ & S_1(1,1) & S_1(1,2) & 0 & S_1(1,3) & S_1(1,4) \\ & & S_1(2,2) & 0 & S_1(2,3) & S_1(2,4) \\ & & & \frac{AE}{l} & 0 & 0 \\ & \text{Symetric} & & & S_1(3,3) & S_1(3,4) \\ & & & & & S_1(4,4) \end{bmatrix}$$

INFLUENCE LINES FOR BEAMS RESTING ON TWO PARAMETER ELASTIC FOUNDATIONS

Differantial equation of beam resting on two parameter elastic foundation:

$$\frac{d^4y}{dx^4} - 2r^2\frac{d^2y}{dx^2} + s^4y = \frac{P}{EI}$$

$$r^2 = \frac{t}{EI} \qquad s^4 = \frac{k}{EI}$$

Here;

k	:	1. foundation modül
t	:	2. foundation modül
EI	:	Stiffness of beam
p	:	External load
y	:	Vertical displacement of beam

The characteristic equation of this differantial equation is obtained with $y = e^{mx}$. The roots of characteristic equation are written as trigonometric and hyperbolic functions.

The general integration of homogenous equation:

$$y = C_1 K_1 + C_2 K_2 + C_3 K_3 + C_4 K_4$$

Here, K_i are independent functions of Φ_i. Initial parameters are y_0, φ_0, M_0, V_0 which values of $y(x)$, $\varphi(x)$, $M(x)$, $V(x)$ at x=0. K_1, K_2, K_3, K_4 are influence functions.

$$y(x) = y_0 K_{yy} + \varphi_0 K_{y\varphi} + M_0 K_{yM} + V_0 K_{yV}$$

$$\varphi(x) = y_0 K_{\varphi y} + \varphi_0 K_{\varphi\varphi} + M_0 K_{\varphi M} + V_0 K_{\varphi V}$$

$$M(x) = y_0 K_{My} + \varphi_0 K_{M\varphi} M_0 K_{MM} + V_0 K_{MV}$$

$$V(x) = y_0 K_{Vy} + \varphi_0 K_{V\varphi} + M_0 K_{VM} + V_0 K_{VV}$$

$y(x)$, $\varphi(x)$, $M(x)$, $V(x)$ would be calculated easyly, when y_0, φ_0, M_0, V_0 are known.

$$y(x) = C_1 \Phi_1 + C_2 \Phi_2 + C_3 \Phi_3 + C_4 \Phi_4$$

$$\varphi(x) = y'$$

$$M(x) = -EI\, y''$$

$$V(x) = -EI\,(y''' - 2r^2 y')$$

C_1, C_2, C_3, C_4 ara calculated with using initial parameters in the upper equations.

Then, C_i is used in same equatios. And coefficients of initial parmeters are influence functions.

y_0 and φ_0 are obtained from boundary conditions.

The boundary conditions are:

$$M_0 = 0 \qquad V_0 = 2\alpha t y_0$$

$$M(l) = 0 \qquad V(l) = -2\alpha t y(l)$$

And influence lines are tabulated by using a computer program for the concentrated unit force and moment seperately at the one to tenth points of the finite beam depending only two characteristic parameters.

BÖLÜM 1

GİRİŞ

Elastik zemine oturan kirişlerin hesabı için, zemin özelliklerini ve davranışını dikkate alan bir çok hipotez vardır. Elastik zemine oturan kirişlere ait çalışmalarda esas hipotez, genellikle zemin tepkileri konusunda yapılan hipotezdir. Bunlar arasında da en çok kullanılanı, zeminin reaksiyonlarının kirişin sehimleri ile orantılı olduğuna dayanan Winkler hipotezidir. Bu orantı k, Winkler zemin modülü veya birinci zemin parametresi olarak adlandırılır.

Winkler zemin modülünde, zemine etkiyen kuvvetler yalnız etkidiği noktada şekil değiştirme oluşturduğu yani bu durumda zemin birbirinden bağımsız ve birbirine sonsuz yakın yaylardan bileşikmiş gibi gözönüne alınmakta, bu yayların yalnız doğrudan doğruya yüklendiklerinde çekip tepki gösterdikleri, ancak her yayın komşu yayların yüklenme ve çökmesinden etkilenmediği kabul edilmektedir.

Fakat gerçekte, yalnız yüklenen bölge deplasman yapmamakta, yüklenen bölgeye bitişik yerler de yüklü bölgeye uzaklıklarıyla orantılı olarak deplasman yapmaktadır.

Bu gerçekten hareketle daha gelişmiş zemin modellerinde ikinci bir parametresi, k_1 daha kullanılmaktadır. İkinci zemin parametresi, zemini temsil eden yayların arasındaki ilişkilere veya zeminin elastik sabitlerine bağlı olarak, değişik zemin modellerinde değişik şekillerde tanımlanmaştır.

En çok kullanılan iki parametreli elastik zemin modelleri ve k_1 ikinci zemin parametreleri şunlardır: [3]

Filonenko - Borodich Zemini:

$$k_1=T_m$$

T_m : Winkler tipindeki yayları birleştiren elastik zardaki sabit gerilme

Pasternak Zemini:

$$k_1=k_G$$

k_G : Kesme seviyesi parametresi

Bu zemin modelinde, yaylar ve yayların üst uçlarının, yalnız kayma deformasyonlarına karşı direnci olan sıkışmaz bir tabaka ile birleştirildiği kabülü yapılır.

Genellestirilmis Zemin:

$$k_1 = k_\theta$$

k_θ : Birim boydaki çubuğun, birim dönmesi için gerekli moment

Bu zemin modelinde, zeminle kirişin değme yüzeyinde yalnız basıncın değil, bunun yanında momentin de bulunduğu kabülü yapılır.

Vlasov Zemini:

$$k_1 = \frac{E_s \delta}{4(1+\nu_s)} \xi$$

E_s : Zeminin elastisite modülü

ν_s : Zeminin poisson oranı

δ : Kiriş genişliği

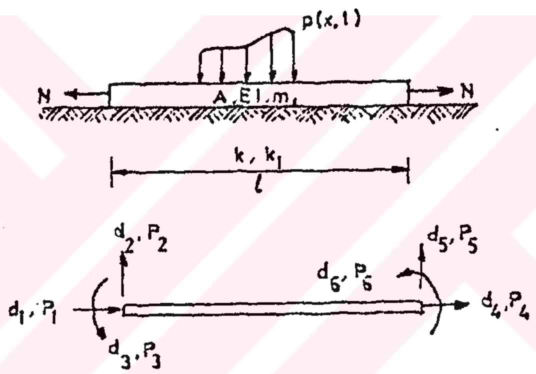
ξ : Zemin üst kotundaki çökmelerin zemin tabakası kalınlığınca azalmasını temsil eden bir büyüklük

BÖLÜM 2

İKİ PARAMETRELİ ELASTİK ZEMİNE OTURAN KİRİŞ ELEMAN İÇİN GENEL BİR RİJİTLİK MATRİSİ

2.1 Kiriş Uç Serbestliklerinin Tanımlanması

Elastik zemine oturan l uzunluklu bir kiriş ve uç serbestlikleri Şekil-2.1 de gösterilmiştir.



ŞEKİL 2.1 Kiris uç serbestlikleri

N	:	Çubuğa etki eden eksenel kuvvet (çekme olması halinde pozitif)
A, EI	:	Çubugun enkesit alanı ve eğilme rijitligi
m_1	:	Çubuğun birim boy kütlesi
k	:	Winkler zemin modülü veya 1. zemin parametresi
k_1	:	2. zemin parametresi

Öncelikle 2., 3.,5, ve 6. serbestliklere ait (4*4) lük rijitlik matrisi elde edilecek ve daha sonra 1. ve 4. serbestliklere ait terimler de ilave edilerek (6*6) lık rijitlik matrisi bulunacaktır.

2.2 Problemin Diferansiyel Denklemi

Elastik zemine oturan N eksenel yüklü kirişin dinamik yük etkisinde diferansiyel hareket denklemi: [1][2]

$$EI y^{(IV)}(x,t) - N y^{//}(x,t) - p(x,t) - m_1 \frac{\partial^2 y(x,t)}{\partial t^2} - q(x,t) \quad (2.1)$$

y(x,t) : Zamana bağlı yer değiştirme

q(x,t) : İki parametreli zeminin elastikliği ve ataletinden dolayı kiriş altında oluşan yayılı reaksiyon

q(x,t) Vlasov ve Leontev tarafından aşagıdaki diferansiyel denklem ile verilmistir. [1]

$$k_1 y^{//} - ky - m_0 \frac{\partial^2 y}{\partial t^2} + q(x,t) = 0 \quad (2.2)$$

m_0 : zeminin kütlesi

(2.2) diferansiyel denklemi, (2.1) diferansiyel denkleminde yerine konulur ve serbest titreşim hali düşünülürse

$$EI y^{(IV)} - (k_1 + N) y^{//} + ky = -(m_1 + m_0) \frac{\partial^2 y}{\partial t^2} \quad (2.3)$$

2.3 Diferansiyel Denklemin Çözümü

$$y(x,t) = w(x) * T(t)$$

varsayımı ile problemin çözümü;

$$T^2 + \omega^2 T = 0 \quad (2.4)$$

$$EI w^{(IV)} - (k_1 + N) w^{//} + [k - (m_1 + m_0)\omega^2] w = 0 \quad (2.5)$$

diferansiyel denklemlerinin çözümüne indirgenmiş olur. Burada, ω serbest titreşimin veya varsa zorlayıcı harmonik kuvvetin açısal frekansıdır.

$$2r^2 = \frac{k_1 + N}{EI} \qquad s^4 = \frac{k - (m_1 + m_0)\,\omega^2}{EI} \qquad (2.6\ a,b)$$

denirse, (2.5) diferansiyel denklemi şu şekli alır:

$$w^{(IV)} - 2r^2 w'' + s^4 w = 0 \qquad (2.7)$$

$w(x) = e^{mx}$ dönüşümü ile (2.7) diferansiyel denkleminin karakteristik denklemi elde edilir:

$$m^4 - 2r^2 m^2 + s^4 = 0 \qquad (2.8)$$

Karakteristik denklemin kökleri reel ve-veya Şekil-2.2 akış diyagramı ile sayısal olarak bulunabilir. Bu kökler bulununca elastik eğri aşagıdaki ifade ile bulunabilir.

$$w = A_1 e^{m_1 x} + A_2 e^{m_2 x} + A_3 e^{m_3 x} + A_4 e^{m_4 x} \qquad (2.9)$$

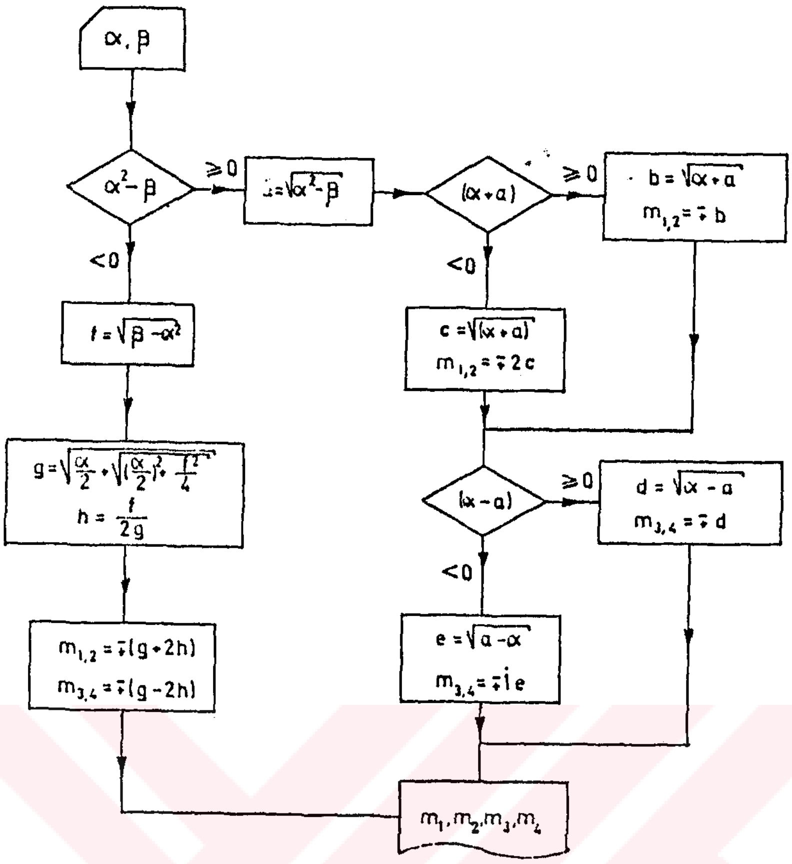
(2.9) ifadesi matris formunda yazılırsa;

$$w = \{G\} * \{A\} \qquad (2.10)$$

$$\{G\} = [e^{m_1 x} \quad e^{m_2 x} \quad e^{m_3 x} \quad e^{m_4 x}] \qquad \{A\}^T = [A_1 \quad A_2 \quad A_3 \quad A_4]$$

Burada [A] matrisi sınır koşullarından elde edilecektir. Sınır koşulları;

$$\{d\} = \begin{bmatrix} d_2 = w(0) \\ d_3 = w'(0) \\ d_5 = w(l) \\ d_6 = w'(l) \end{bmatrix} \qquad (2.11)$$



ŞEKİL 2.2 Karakteristik denklemin köklerinin bulunması

$$\{d\} = \begin{bmatrix} 1 & 1 & 1 & 1 \\ m_1 & m_2 & m_3 & m_4 \\ e^{m_1 l} & e^{m_2 l} & e^{m_3 l} & e^{m_4 l} \\ m_1 e^{m_1 l} & m_2 e^{m_2 l} & m_3 e^{m_3 l} & m_4 e^{m_4 l} \end{bmatrix} \begin{bmatrix} A_1 \\ A_2 \\ A_3 \\ A_4 \end{bmatrix} = [B]\,\{A\} \qquad (2.12)$$

(2.12) ifadesinin her iki tarafı [B] nin tersi ile çarpılırsa [A] matrisi elde edilmiş olur.

$$\{A\} = [B]^{-1}\{d\} \qquad (2.13)$$

Burada [B] ve dolayısıyla [B] nin tersi karakteristik denklemin kökleri bulununca, değerleri belli olan matrislerdir. [A] matrisini (1.10) ifadesinde yerine koyarsak;

$$w = \{G\}\,[B]^{-1}\{d\} = \{N\}\,\{d\} \qquad (2.14)$$

$$\{N\} = \{G\}\,[B]^{-1} \qquad (2.15)$$

[G] ve inv[B] matrisleri sayısal olarak belli olan matrisler olduğundan bir satır matris olan [N] şekil fonksiyonu sayısal olarak bellidir. [G] ve inv[B] matrisleri sanal terimler içermekte iseler de bunların çarpımları bütün hallerde gerçeldir.

2.4 Eleman Rijitlik Matrisi

Kesme kuvveti ve eğilme momentine ait diferansiyel denklemler:

$$V = -EI\frac{d^3w}{dx^3} + (N_0 + k_1)\frac{dw}{dx} = -EI\left[\frac{d^3w}{dx^3} - 2r^2\frac{dw}{dx}\right] \qquad (2.16)$$

$$M = -EI\frac{d^2w}{dx^2} \qquad (2.17)$$

$$M = -EI\frac{d^2w}{dx^2} = -EI\frac{d^2}{dx^2}[G]\,[A] = -EI\,[m_1^2e^{m_1x} \quad m_2^2e^{m_2x} \quad m_3^2e^{m_3x} \quad m_4^2e^{m_4x}]\,[A] \qquad (2.18)$$

$$V = -EI\left[\frac{d^3w}{dx^3} - 2r^2\frac{dw}{dx}\right] = -EI\,[(m_1^3 - 2r^2m_1)\,e^{m_1x} \quad (m_2^3 - 2r^2m_2)\,e^{m_2x} \quad (m_3^3 - 2r^2m_3)\,e^{m_3x} \quad (m_4^3 - 2r^2m_4)\,e^{m_4x}]\,[A] \qquad (2.19)$$

[P] : Uç kuvvetleri matrisi

$$\{P\} = \begin{bmatrix} P_2 \\ P_3 \\ P_5 \\ P_6 \end{bmatrix} = \begin{bmatrix} (V)_{x=0} \\ -(M)_{x=0} \\ -(V)_{x=l} \\ (M)_{x=l} \end{bmatrix} \qquad (2.20)$$

$$\{P\} = -EI \begin{bmatrix} m_1^3-2r^2m_1 & m_2^3-2r^2m_2 & m_3^3-2r^2m_3 & m_4^3-2r^2m_4 \\ -m_1^2 & -m_2^2 & -m_3^2 & -m_4^2 \\ -(m_1^3-2r^2m_1) & -(m_2^3-2r^2m_2) & -(m_3^3-2r^2m_3) & -(m_4^3-2r^2m_4) \\ e^{m_1 l} & e^{m_2 l} & e^{m_3 l} & e^{m_4 l} \\ m_1^2 e^{m_1 l} & m_2^2 e^{m_2 l} & m_3^2 e^{m_3 l} & m_4^2 e^{m_4 l} \end{bmatrix} \{A\} \qquad (2.21)$$

$$\{P\} = [C]\,\{A\} \qquad \{A\} = [B]^{-1}\{d\}$$

$$\{P\} = [C]\ [B]^{-1}\{d\} \qquad (2.22)$$

Burada, [C] ve inv[B] matrisleri sayısal olarak bilinmektedir. (1.22) ifadesinde eleman uç kuvvetlerini, eleman uç deplasmanlarına bağlayan [C]*inv[B] matris çarpımı rijitlik matrisidir.

$$[S_1] = [C]\ [B]^{-1} \qquad (2.23)$$

Bu matris (4*4) boyutundadır.

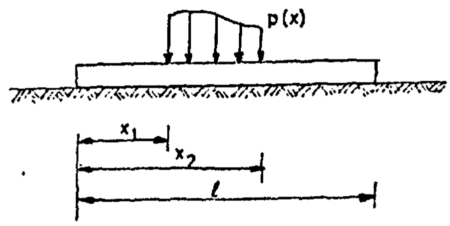
$$\begin{bmatrix} P_1 \\ P_4 \end{bmatrix} = \begin{bmatrix} \frac{AE}{l} & -\frac{AE}{l} \\ -\frac{AE}{l} & \frac{AE}{l} \end{bmatrix} \begin{bmatrix} d_1 \\ d_4 \end{bmatrix} \qquad (2.24)$$

(1.24) bağıntısındaki elemanlar $[S_1]$ matrisine katılarak (6*6) lık genel rijitlik matrisi elde edilmiş olur.

$$[S] = \begin{bmatrix} \frac{AE}{l} & 0 & 0 & -\frac{AE}{l} & 0 & 0 \\ & S_1(1,1) & S_1(1,2) & 0 & S_1(1,3) & S_1(1,4) \\ & & S_1(2,2) & 0 & S_1(2,3) & S_1(2,4) \\ & & & \frac{AE}{l} & 0 & 0 \\ & \textit{simetrik} & & & S_1(3,3) & S_1(3,4) \\ & & & & & S_1(4,4) \end{bmatrix} \qquad (2.25)$$

2.5 Eşdeğer Düğüm Noktası Kuvvetleri

[P] düğüm noktası kuvvetler matrisi, p(x) kiriş üzerindeki yayılı yük olduğuna göre



ŞEKİL 2.3 Kiris üzerinde yayılı yük

$$[P]=\int_{x_1}^{x_2}[N]\,p(x)\,dx \qquad (2.26)$$

Üniform yük için:

$$[P]=\int_{x_1}^{x_2}[G]\,[B]^{-1}p\,dx \qquad (2.27)$$

$$[P]=p\,[B]^{-1}\int_{x_1}^{x_2}[G]\,dx \qquad (2.28)$$

$$[P]=p\,[B]^{-1}\begin{bmatrix}\frac{1}{m_1}(e^{m_1x_2}-e^{m_1x_1})\\ \frac{1}{m_2}(e^{m_2x_2}-e^{m_2x_1})\\ \frac{1}{m_3}(e^{m_3x_2}-e^{m_3x_1})\\ \frac{1}{m_4}(e^{m_4x_2}-e^{m_4x_1})\end{bmatrix} \qquad (2.29)$$

BÖLÜM 3

İKİ PARAMETRELİ ELASTİK ZEMİNE OTURAN KİRİŞİN DİFERANSİYEL DENKLEMİ

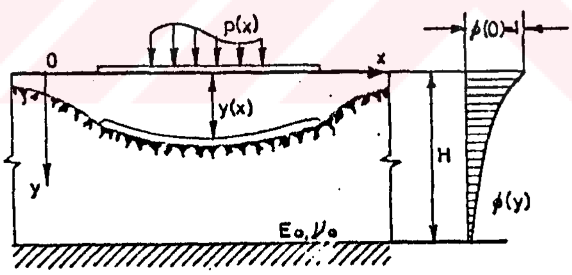
3.1 Problemin Diferansiyel Denklemi

Elastik zemine oturan, üzerinde p(x) yükü bulunan bir kirişin elastik eğrisinin diferansiyel denklemi: [1]

$$EI\frac{d^4y}{dx^4} - p(x) - q(x) \qquad (3.1)$$

q(x) = Elastik zeminin reaksiyonu

y(x) = Kirişin y-doğrultusundaki deplasmanı



SEKIL 3.1 Iki parametreli elastik zemine oturan kiris

(3.1) diferansiyel denklemi y(x) ve q(x) olmak üzere iki bilinmeyen içerir. Fakat bu iki bilinmeyen arasında aşağıdaki diferansiyel denklemle belirlenmiş bir ilişki vardır.

$$-2t\frac{d^2y}{dx^2} + ky - q(x)\,\Psi(0) \qquad (3.2a)$$

$\psi(y)$ fonksiyonunu $\psi(0)=1$ olacak sekilde seçmek uygundur. y(x) zemin yüzeyindeki çökmeye karşılık geldiğine göre (3.2a)diferansiyel denklemi aşağıdaki şekli alır.

$$-2t\frac{d^2y}{dx^2}+ky=q(x) \qquad (3.2b)$$

$$k=\frac{E_0\delta}{1-\nu_0^2}\int_0^H \Psi'^2(y)\,dy \qquad (3.3a)$$

$$t=\frac{E_0\delta}{4(1+\nu_0)}\int_0^H \Psi^2(y)\,dy \qquad (3.3b)$$

(3.2b)deki q(x) değeri (3.1)de yerine konursa;

$$EI\frac{d^4y}{dx^4}-2t\frac{d^2y}{dx^2}+ky=p(x) \qquad (3.4)$$

diferansiyel denklemi elde edilir.

(3.4) ifadesi; iki parametreli elastik zemine oturan kirişin difaransiyel denklemidir. Bu denklem elastik zemindeki kayma gerilmelerinin etkisini gözönüne alır.

Eğer kayma gerilmelerini dikkate alan t parametresine sıfır değeri verilirse (3.4)ifadesi Winkler zeminine oturan kirişin diferansiyel denklemi ile aynı olur.[4]

$r^2=\frac{t}{EI}$, $s^4=\frac{k}{EI}$ olmak üzere (3.4)diferansiyel denklemi düzenlenirse;

$$\frac{d^4y}{dx^4}-2r^2\frac{d^2y}{dx^2}+s^4y=\frac{p}{EI} \qquad (3.5)$$

3.2 Kesit Tesirlerinin Bulunması

Eger y(x) bulunursa zemin reaksiyonları (3.2b) denkleminden bulunabilir. Kirişteki moment,kesme kuvveti ve normal kesme kuvveti ifadeleri ise aşağıdaki şekilde bulunur.

$$M = -EI\frac{d^2y}{dx^2}$$

$$V = -EI\left[\frac{d^3y}{dx^3} - 2r^2\frac{dy}{dx}\right] \qquad (3.6)$$

$$V = -EI\frac{d^3y}{dx^3}$$

3.3 Diferansiyel Denklemin Çözümü

İlk önce (3.5) diferansiyel denkleminin homojen çözümünün bulunması gerekir. Homojen denklem:

$$\frac{d^4y}{dx^4} - 2r^2\frac{d^2y}{dx^2} + s^4y = 0 \qquad (3.7)$$

(6) diferansiyel denkleminin genel integrali:

$$y(x) = C_1\Phi_1 + C_2\Phi_2 + C_3\Phi_3 + C_4\Phi_4 \qquad (3.8)$$

Burada;

C_1, C_2, C_3, C_4 : İntegrasyon sabitleri

$\Phi_1, \Phi_2, \Phi_3, \Phi_4$: Karakteristik denklemin kökleri

$y = e^{mx}$ dönüşümü yapılırsa, karakteristik denklem şu şekilde olur:

$$m^4 - 2r^2m^2 + s^4 = 0 \qquad (3.9)$$

3.3.1 Karakteristik Denklemin Köklerinin Bulunması

Karakteristik denklemin çözümünde s ve r'ye göre üç durum söz konusudur.[7]

<u>1-s > r olması durumu:</u>

$$m^2 = u$$

$$u^2 - 2r^2u + s^4 = 0$$

$$u_{1,2}=r^2 \mp \sqrt{r^4-s^4}$$

$$u_{1,2}=r^2 \mp i\sqrt{s^4-r^4}$$

$$m=\mp\sqrt{r^2 \mp i\sqrt{s^4-r^4}}=\alpha+\beta i$$

$$\alpha=\sqrt{\frac{s^2+r^2}{2}} \qquad \beta=\sqrt{\frac{s^2-r^2}{2}}$$

$$m=\mp\alpha\mp\beta i$$

<u>2- s=r olması durumu:</u>

$$m^2=u$$

$$u^2-2r^2u+s^4=0$$

$$u_{1,2}=r^2$$

$$m=\mp r$$

<u>3- s < r olması durumu:</u>

$$m^2=u$$

$$u^2-2r^2u+s^4=0$$

$$u_{1,2}=r^2\mp\sqrt{r^4-s^4}$$

$$\lambda_1=\sqrt{r^2+\sqrt{r^4-s^4}}$$

$$\lambda_2=\sqrt{r^2-\sqrt{r^4-s^4}}$$

$$m_{1,2}=\mp\lambda_1 \qquad m_{3,4}=\mp\lambda_2$$

Bu köklerin hiperbolik ve trigonometrik fonksiyonlar cinsinden ifadesi ve birinci, ikinci, üçüncü dereceden türevleri Tablo1 de gösterilmiştir.

TABLO 3.1 Karakteristik denklemin kökleri ve köklerin türevleri

		ϕ_1	ϕ_2	ϕ_3	ϕ_4
s>r	ϕ	$sh\alpha x.\cos\beta x$	$ch\alpha x.\cos\beta x$	$ch\alpha x.\sin\beta x$	$sh\alpha x.\sin\beta x$
	ϕ'	$\alpha\phi_2-\beta\phi_4$	$\alpha\phi_1-\beta\phi_3$	$\alpha\phi_4+\beta\phi_2$	$\alpha\phi_3+\beta\phi_1$
	ϕ''	$(\alpha^2-\beta^2)\ \phi_1-$ $-2\alpha\beta\ \phi_3$	$(\alpha^2-\beta^2)\ \phi_2-$ $-2\alpha\beta\ \phi_3$	$(\alpha^2-\beta^2)\ \phi_3+$ $+2\alpha\beta\ \phi_1$	$(\alpha^2-\beta^2)\ \phi_4+$ $+2\alpha\beta\ \phi_2$
	ϕ'''	$\alpha(\alpha^2-3\beta^2)\ \phi_2+$ $+\beta(\beta^2-3\alpha^2)\ \phi_4$	$\alpha(\alpha^2-3\beta^2)\ \phi_1+$ $+\beta(\beta^2-3\alpha^2)\ \phi_3$	$\alpha(\alpha^2-3\beta^2)\ \phi_4-$ $-\beta(\beta^2-3\alpha^2)\ \phi_2$	$\alpha(\alpha^2-3\beta^2)\ \phi_3-$ $-\beta(\beta^2-3\alpha^2)\ \phi_1$
s=r	ϕ	$shrx$	$chrx$	$x.chrx$	$x.shrx$
	ϕ'	$r\phi_2$	$r\phi_1$	$\phi_2+r\phi_4$	$\phi_1+r\phi_3$
	ϕ''	$r^2\phi_1$	$r^2\phi_2$	$2r\phi_1+r^2\phi_3$	$2r\phi_2+r^2\phi_4$
	ϕ'''	$r^3\phi_2$	$r^3\phi_1$	$3r^2\phi_2+r^3\phi_4$	$3r^2\phi_1+r^3\phi_3$
s<r	ϕ	$sh\rho_1 x$	$ch\rho_1 x$	$sh\rho_2 x$	$ch\rho_2 x$
	ϕ'	$\rho_1\phi_2$	$\rho_1\phi_1$	$\rho_2\phi_4$	$\rho_2\phi_3$
	ϕ''	$\rho_1^2\phi_1$	$\rho_1^2\phi_2$	$\rho_2^2\phi_3$	$\rho_2^2\phi_4$
	ϕ'''	$\rho_1^3\phi_2$	$\rho_1^3\phi_1$	$\rho_2^3\phi_4$	$\rho_2^3\phi_3$

3.4 Başlangıç Parametreleri ile Çözüm

3.4.1 Homojen Denklemin Genel İntegrali

Yükün tekil kuvvet veya tekil moment olduğu kabul edilecektir. Bu kuvvetin uygulama noktaları arasında kirişin elastik eğrisi, (3.6) homojen denkleminden bulunabilir. Homojen çözüm genel integrali şeklinde yazılırsa;

$$y = C_1K_1 + C_2K_2 + C_3K_3 + C_4K_4 \quad (3.10)$$

Burada K_1, K_2, K_3, K_4, $\phi_1, \phi_2, \phi_3, \phi_4$ ün bağımsız lineer fonksiyonlarıdır. K_1, K_2, K_3, K_4 öyle şekilde seçilir ki; bunlarla ifade edilen y, φ ,M,V değerleri, x=0 da birim matrisi olustursun.

i	$y(0)=K_i(0)$	$\varphi(0)=-K_i^{/}(0)$	$M(0)=-EIK_i^{//}(0)$	$V(0)=-EI[K_i^{///}-2r^2K_i^{/}(0)]$
1	1	0	0	0
2	0	1	0	0
3	0	0	1	0
4	0	0	0	1

Buradan; $C_1=y_0$, $C_2=\varphi_0$, $C_3=M_0$, $C_4=V_0$ elde edilir.

w_0, φ_0 ,M_0,V_0; x=0 da w, φ ,M,V nin aldığı değerler, yani baslangıç parametreleridir.

K_1, K_2, K_3, K_4; baslangıç parametrelerinin deplasman, dönme, moment ve kesme kuvveti üzerindeki etkisini ifade eder.

$K_1=K_{yy}$,$K_2=K_{y\varphi}$, $K_3=K_{yM}$, $K_4=K_{yV}$ denirse;

$$y(x)=y_0K_{yy}+\varphi_0K_{y\varphi}+M_0K_{yM}+V_0K_{yV}$$

$$\varphi(x)=y_0K_{\varphi y}+\varphi_0K_{\varphi\varphi}+M_0K_{\varphi M}+V_0K_{\varphi V}$$

$$M(x) = y_0 K_{My} + \varphi_0 K_{M\varphi} + M_0 K_{MM} + V_0 K_{MV}$$

$$V(x) = y_0 K_{Vy} + \varphi_0 K_{V\varphi} + M_0 K_{VM} + V_0 K_{VV} \qquad (3.11)$$

Görüldüğü gibi y_0, φ_0, M_0, V_0 başlangıç parametreleri bilininince, kirişin herhangi bir noktasındaki w, φ, M, V bunlara bağlı olarak bulunabilir.

Benzer şekilde, x=t kesitinde y_t, φ_t, M_t, v_t değerleri biliniyorsa, bu kesit baslangıç kesiti olarak alınabilir ve y, φ, M, V değerleri aynı tesir fonksiyonları kullanılarak bulunabilir.

$$y(x) = y_t K_{yy} + \varphi_t K_{y\varphi} + M_t K_{yM} + V_t K_{yV}$$

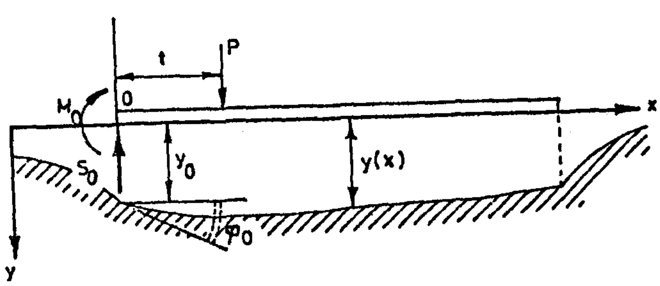
$$\varphi(x) = y_t K_{\varphi y} + \varphi_t K_{\varphi\varphi} + M_t K_{\varphi M} + V_t K_{\varphi V}$$

$$M(x) = y_t K_{My} + \varphi_t K_{M\varphi} + M_t K_{MM} + V_t K_{MV} \qquad (3.12)$$

$$V(x) = y_t K_{Vy} + \varphi_t K_{V\varphi} + M_t K_{VM} + V_t K_{VV}$$

Yalnız, burada tesir fonksiyonlarının değerleri bulunurken $\phi_i(x)$ yerine $\phi_i(x-t)$ alınır.

3.4.2 Dış Yüklerin Etkisi



ŞEKİL 3.2 Tekil kuvvet durumunda baslangıc parametreleri

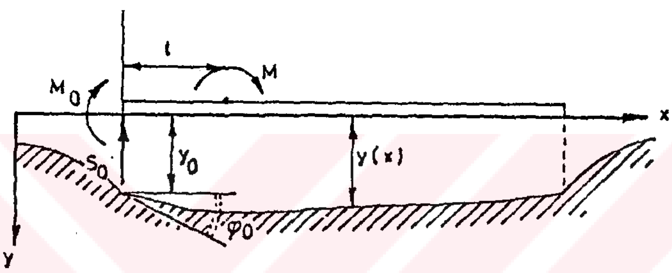
0 < x <t aralığında homojen diferansiyel denklemden bulunan ifadeler aynen geçerlidir. Tekil kuvvetin etkisi x >t den sonra başlar. Bu etki, aşağıdaki şekilde dikkate alınır.

$$y(x) = y_0 K_{yy}(x) + \varphi_0 K_{y\varphi}(x) + M_0 K_{yM}(x) + V_0 K_{yV}(x) - P K_{yV}(x-t)$$

$$\varphi(x) = y_0 K_{\varphi y}(x) + \varphi_0 K_{\varphi\varphi}(x) + M_0 K_{\varphi M}(x) + V_0 K_{\varphi V}(x) - P K_{\varphi V}(x-t) \qquad (3.13)$$

$$M(x) = y_0 K_{My}(x) + \varphi_0 K_{M\varphi}(x) + M_0 K_{MM}(x) + V_0 K_{MV}(x) - P K_{MV}(x-t)$$

$$V(x) = y_0 K_{Vy}(x) + \varphi_0 K_{V\varphi}(x) + M_0 K_{VM}(x) + V_0 K_{VV}(x) - P K_{VV}(x-t)$$



ŞEKİL 3.3 Tekil moment durumunda baslangıc parametreleri

Eğer tekil kuvvet yerine tekil moment varsa;

$$y(x) = y_0 K_{yy}(x) + \varphi_0 K_{y\varphi}(x) + M_0 K_{yM}(x) + V_0 K_{yV}(x) - M K_{yM}(x-t)$$

$$\varphi(x) = y_0 K_{\varphi y}(x) + \varphi_0 K_{\varphi\varphi}(x) + M_0 K_{\varphi M}(x) + V_0 K_{\varphi V}(x) - M K_{\varphi M}(x-t) \qquad (3.14)$$

$$M(x) = y_0 K_{My}(x) + \varphi_0 K_{M\varphi}(x) + M_0 K_{MM}(x) + V_0 K_{MV}(x) - M K_{MM}(x-t)$$

$$V(x) = y_0 K_{Vy}(x) + \varphi_0 K_{V\varphi}(x) + M_0 K_{VM}(x) + V_0 K_{VV}(x) - M K_{VM}(x-t)$$

3.4.3 Tesir Fonksiyonlarının Bulunması

$$y(x) = C_1\Phi_1 + C_2\Phi_2 + C_3\Phi_3 + C_4\Phi_4$$

$$\varphi(x) = y'$$

$$M(x) = -EI\,y''$$
$$V(x) = -EI[y''' - 2r^2 y'] \qquad (3.15)$$

(3.15) ifadelerinde x=0 da başlangıç parametrelerini kullanıp C_1, C_2, C_3, C_4 değerleri bulunurak (13) deki yerlerine konur ve y_0, φ_0, M_0, V_0 ın katsayıları bulunursa tesir fonksiyonları bulunmuş olur.

Şimdi en çok karşılaşılan durum olan <u>s>r hali</u> için tesir fonksiyonları bulunacaktır.

$$y(x) = C_1\Phi_1 + C_2\Phi_2 + C_3\Phi_3 + C_4\Phi_4$$

$$\varphi(x) = [C_1(\alpha\phi_2 - \beta\phi_4) + C_2(\alpha\phi_1 - \beta\phi_3) + C_3(\alpha\phi_4 + \beta\phi_2) + C_4(\alpha\phi_3 + \beta\phi_1)]$$

$$M(x) = -EI[C_1[(\alpha^2-\beta^2)\phi_1 - 2\alpha\beta\phi_3] + C_2[(\alpha^2-\beta^2)\phi_2 - 2\alpha\beta\phi_4] +$$
$$+ C_3[(\alpha^2-\beta^2)\phi_3 + 2\alpha\beta\phi_1] + C_4[(\alpha^2-\beta^2)\phi_4 + 2\alpha\beta\phi_2]] \qquad (3.16)$$

$$V(x) = -EI[C_1[\alpha(\alpha^2-3\beta^2)\phi_2 + \beta(\beta^2-3\alpha^2)\phi_4 - 2r^2\alpha\phi_2 + 2r^2\beta\phi_4] +$$
$$+ C_2[\alpha(\alpha^2-3\beta^2)\phi_1 + \beta(\beta^2-3\alpha^2)\phi_3 - 2r^2\alpha\phi_1 + 2r^2\beta\phi_3]$$
$$+ C_3[\alpha(\alpha^2-3\beta^2)\phi_4 - \beta(\beta^2-3\alpha^2)\phi_2 - 2r^2\alpha\phi_4 - 2r^2\beta\phi_2]$$
$$+ C_4[\alpha(\alpha^2-3\beta^2)\phi_3 - \beta(\beta^2-3\alpha^2)\phi_1 - 2r^2\alpha_3 - 2r^2\beta\phi_1]]$$

Bu ifadelerde x=0 da $\phi_2=1$ $\phi_1=\phi_3=\phi_4=0$ $y=y_0$ $\varphi=\varphi_0$ $M=M_0$ $V=V_0$ başlangıç parametreleri kullanılırsa;

$$y_0 = C_2$$

$$\varphi_0 = (C_1\alpha + C_3\beta)$$

$$M_0 = -EI\,[\,C_2(\alpha^2-\beta^2) + C_4 2\alpha\beta\,]$$

$$V_0 = -EI\,[\,C_1[\alpha(\alpha^2-3\beta^2)-2r^2\alpha] - C_3[\beta(\beta^2-3\alpha^2)+2r^2\beta]\,] \qquad (3.17)$$

Bu dört denklemden C_1, C_2, C_3, C_4 bulunur:

$$C_2 = y_0$$

$$C_1 = \frac{1}{2\alpha\beta s^2}\left[\beta\frac{1}{EI}V_0 + \beta s^2\varphi_0\right]$$

$$C_3 = \frac{1}{2\alpha\beta s^2}\left[s^2\alpha\varphi_0 - \alpha\frac{1}{EI}V_0\right] \qquad (3.18)$$

$$C_4 = -\frac{1}{2\alpha\beta}\left[r^2 y_0 + \frac{1}{EI}M_0\right]$$

Bu C değerleri (3.16) ifadelerinde yerine konursa y_0, φ_0, M_0, V_0 ın başındaki katsayılar, tesir fonksiyonlarını verir.

$$y(x) = C_1\Phi_1 + C_2\Phi_2 + C_3\Phi_3 + C_4\Phi_4 \qquad (3.19)$$

$$y(x) = \frac{1}{2\alpha\beta s^2}\left[\beta\frac{1}{EI}V_0 + \beta s^2\varphi_0\right]\phi_1 + y_0\phi_2 + \frac{1}{2\alpha\beta s^2}\left[s^2\alpha\varphi_0 - \alpha\frac{1}{EI}V_0\right]\phi_3 - \frac{1}{2\alpha\beta}\left[r^2 y_0 + \frac{1}{EI}M_0\right]\phi_4 \qquad (3.20)$$

$$y(x) = K_{yy}y_0 + K_{y\varphi}\varphi_0 + K_{yM}M_0 + K_{yV}V_0 \qquad (3.21)$$

Buradan;

$$K_{yy} = \phi_2 - \frac{r^2}{2\alpha\beta}\phi_4$$

$$K_{y\varphi} = \frac{1}{2\alpha\beta}\,(\beta\phi_1 + \alpha\phi_3) \qquad (3.22)$$

$$K_{yM} = -\frac{1}{2\alpha\beta EI}\phi_4$$

$$K_{yV} = \frac{1}{2\alpha\beta s^2 EI}(\beta\phi_1 - \alpha\phi_3)$$

$$\varphi(x) = [\frac{1}{2\alpha\beta s^2}\left(\beta\frac{1}{EI}V_0 + \beta s^2\varphi_0\right)(\alpha\phi_2 - \beta\phi_4) + y_0(\alpha\phi_1 - \beta\phi_3) + \tag{3.23}$$

$$+\frac{1}{2\alpha\beta s^2}\left(s^2\alpha\varphi_0 - \alpha\frac{1}{EI}V_0\right)(\alpha\phi_4 + \beta\phi_2) - \frac{1}{2\alpha\beta}\left(r^2 y_0 + \frac{1}{EI}M_0\right)(\alpha\phi_3 + \beta\phi_1)]$$

$$\varphi(x) = y_0 K_{\varphi y} + \varphi_0 K_{\varphi\varphi} + M_0 K_{\varphi M} + V_0 K_{\varphi V} \tag{3.24}$$

$$K_{\varphi y} = \frac{s^2}{2\alpha\beta}(\beta\phi_1 - \alpha\phi_3)$$

$$K_{\varphi\varphi} = \phi_2 + \frac{r^2}{2\alpha\beta}\phi_4 \tag{3.25}$$

$$K_{\varphi M} = -\frac{1}{2\alpha\beta EI}(\alpha\phi_3 + \beta\phi_1)$$

$$K_{\varphi V} = -\frac{1}{2\alpha\beta EI}\phi_4 = K_{yM}$$

$$M(x) = -EI[\frac{1}{2\alpha\beta s^2}\left[\beta\frac{1}{EI}V_0 + \beta s^2\varphi_0\right][(\alpha^2-\beta^2)\phi_1 - 2\alpha\beta\phi_3] +$$

$$y_0[(\alpha^2-\beta^2)\phi_2 - 2\alpha\beta\phi_4] + \frac{1}{2\alpha\beta s^2}\left[s^2\alpha\varphi_0 - \alpha\frac{1}{EI}V_0\right][(\alpha^2-\beta^2)\phi_3 + 2\alpha\beta\phi_1] - \tag{3.26}$$

$$-\frac{1}{2\alpha\beta}\left[r^2 y_0 + \frac{1}{EI}M_0\right][(\alpha^2-\beta^2)\phi_4 + 2\alpha\beta\phi_2]]$$

$$K_{My} = \frac{EIs^4}{2\alpha\beta}\phi_4$$

$$K_{M\varphi} = -\frac{EI}{2\alpha\beta}\,[\beta\,(3\alpha^2-\beta^2)\,\phi_1 + \alpha\,(\alpha^2-3\beta^2)\,\phi_3]$$

$$K_{MM} = \phi_2 + \frac{r^2}{2\alpha\beta}\phi_4 = K_{\varphi\varphi} \qquad (3.27)$$

$$K_{MV} = \frac{1}{2\alpha\beta}\,(\beta\phi_1 + \alpha\phi_3) = K_{y\varphi}$$

$$K_{Vy} = \frac{EIs^2}{2\alpha\beta}\,[\,(s^2+2r^2)\,\beta\phi_1 - (2r^2-s^2)\,\alpha\phi_3]$$

$$K_{V\varphi} = EI\frac{1}{2\alpha\beta}\,s^4\phi_4 = K_{My}$$

$$(3.28)$$

$$K_{VM} = \frac{s^2}{2\alpha\beta}\,(\beta\phi_1 - \alpha\phi_3) = K_{\varphi y}$$

$$K_{VV} = \phi_2 - \frac{r^2}{2\alpha\beta}\phi_4 = K_{yy}$$

3.5 Başlangıç Parametrelerinin Bulunması

Elastik zemine oturan kiriş probleminin genel çözümü daha önce aşağıdaki sekilde bulunmuştu:

$$y(x) = y_0K_{yy} + \varphi_0K_{\varphi} + M_0K_{yM} + V_0K_{yV} - F_y$$

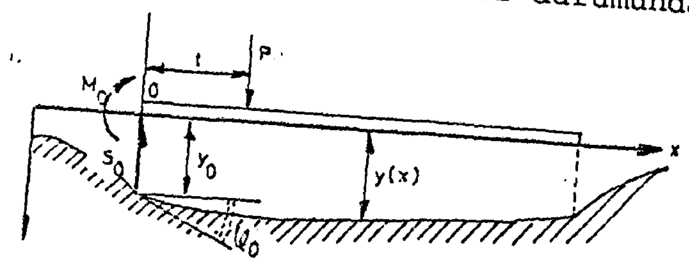
$$\varphi(x) = y_0K_{\varphi y} + \varphi_0K_{\varphi\varphi} + M_0K_{\varphi M} + V_0K_{\varphi V} - F_{\varphi} \qquad (3.29)$$

$$M(x) = y_0K_{My} + \varphi_0K_{M\varphi} + M_0K_{MM} + V_0K_{MV} - F_M$$

$$V(x) = y_0K_{Vy} + \varphi_0K_{V\varphi} + M_0K_{VM} + V_0K_{VV} - F_V$$

Buradaki $K_{yy}, K_{y\varphi}, \ldots\ldots, K_{VV}$ tesir fonksiyonları da daha önce bulunmuştu. F_y, F_φ, F_M, F_V fonksiyonları ise dış yüke göre belirlenir.

Dış yükün tekil kuvvet olması durumunda:



ŞEKİL 3.4 Tekil kuvvet durumunda baslangıc parametreleri

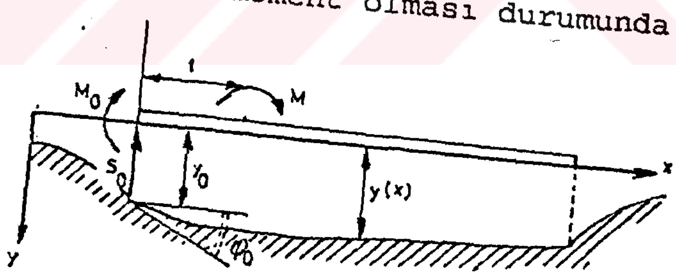
$$F_y = PK_{yV}(x-t_1)$$

$$F_\varphi = PK_{\varphi V}(x-t_1)$$

$$F_M = PK_{MV}(x-t_1) \qquad (3.30)$$

$$F_V = PK_{VV}(x-t_1)$$

Dış yükün tekil moment olması durumunda:



ŞEKİL 3.5 Tekil moment durumunda baslangıc parametreleri

$$F_y = -MK_{yM}(x-t_1)$$

$$F_\varphi = -MK_{\varphi M}(x-t_1)$$

$$F_M = MK_{MM}(x-t_1) \qquad (3.31)$$

$$K_V = -MK_{VM}(x-t_1)$$

Başlangıç parametreleri kiriş uçlarındaki sınır şartlarından bulunacaktır. Elastik zemine iki ucu serbest oturan l uzunluklu kirişte sınır şartları;

$$M_0 = 0 \qquad V_0 = S(0) = 2\zeta t y_0 \qquad (3.32)$$

Kiriş ucundaki dönme ve deplasman bilinmemektedir. Bu durumda (3.27) ifadeleri sınır şartları uygulanarak yeniden düzenlenirse;

$$\begin{aligned}
y(x) &= (K_{yy} + 2\zeta t K_{yV}) y_0 + K_{y\varphi}\varphi_0 - F_y \\
\varphi(x) &= (K_{\varphi y} + 2\zeta t K_{\varphi V}) y_0 + K_{\varphi\varphi}\varphi_0 - F_\varphi \\
M(x) &= (K_{My} + 2\zeta t K_{MV}) y_0 + K_{M\varphi}\varphi_0 - F_M \\
V(x) &= (K_{Vy} + 2\zeta t K_{VV}) y_0 + K_{V\varphi}\varphi_0 - F_V
\end{aligned} \qquad (3.33)$$

(3.33c) ve (3.33d) denklemlerinde kirişin diğer ucundaki sınır şartları uygulanırsa;

$$M(l) = 0 \qquad V(l) = -2\zeta t y(l) \qquad (3.34)$$

$$M(l) = 0 = [K_{My}(l) + 2\zeta t K_{MV}(l)] y_0 + K_{M\varphi}(l)\varphi_0 - F_M(l) \qquad (3.35a)$$

$$V(l) = -2\zeta t y(l) = [K_{Vy}(l) + 2\zeta t K_{VV}(l)] y_0 + K_{V\varphi}\varphi_0 - F_V(l) \qquad (3.35b)$$

(3.35b) denklemi y(l) ifadesi yerine yazılarak ve

$K_{yy} = K_{VV}$, $K_{V\varphi} = K_{My}$, $K_{y\varphi} = K_{MV}$ eşitliklerinden de faydalanılarak

yeniden düzenlenirse;

$$[4\zeta t K_{VV}(l) + (2\zeta t)^2 K_{yV}(l) + K_{Vy}(l)] y_0 + \qquad (3.35b')$$

$$+ [K_{My}(l) + 2\zeta t K_{MV}(l)]\varphi_0 = F_V(l) + 2\zeta t F_y(l)$$

$$a_1 = K_{My}(l) + 2\zeta t K_{MV}(l)$$

$$a_2 = K_{M\varphi}(l) \qquad (2.36)$$

$$a_3 = 4\zeta t K_{VV}(1) + (2\zeta t)^2 K_{yV}(1) + K_{Vy}(1)$$

olmak üzere (3.35) denklemleri yeniden yazılırsa;

$$a_1 y_0 + a_2 \varphi_0 = F_M(1)$$

(2.37)

$$a_3 y_0 + a_1 \varphi_0 = F_V(1) + 2\zeta t F_y(1)$$

(3.37) deklemlerinden y_0 ve φ_0 çözüldüğünde aşağıdaki ifadeler bulunur.

$$y_0 = \frac{a_1 F_M(1) - a_2 [F_V(1) + 2\zeta t F_y(1)]}{a_1^2 - a_2 a_3} \qquad (3.38)$$

$$\varphi_0 = -\frac{a_3 F_M(1) - a_1 [F_V(1) + 2\zeta t F_y(1)]}{a_1^2 - a_2 a_3} \qquad (3.39)$$

3.6 Bilgisayar Programı Yardımıyla Tesir Çizgileri Tablolarının Hazırlanması

3.6.1 Bilgisayar Programı İçin Formülasyon

s>r olması durumunda, karakteristik denklemin kökleri; $m = \mp\alpha \mp \beta$ olarak bulunmuştu. Burada;

$$\alpha = \sqrt{\frac{s^2 + r^2}{2}} \quad , \quad \beta = \sqrt{\frac{s^2 - r^2}{2}}$$

$$s^2 = \alpha^2 + \beta^2 \quad , \quad r^2 = \alpha^2 - \beta^3 \qquad (3.40)$$

$$\zeta = \sqrt{\frac{k}{2t}} \quad , \quad \zeta t = \sqrt{k\frac{t}{2}} = \frac{EIs^2 r}{\sqrt{2}}$$

Zemin parametreleri k ve t belli olduğunda s ve r dolayısıyla α ve ß bellidir.

L, kiriş boyu olmak üzere $\alpha.L=\lambda_1$, $\beta.L=\lambda_2$ değerleri belli olan büyüklüklerdir.

Daha önce çıkartılmış bulunan tesir fonksiyonları ve başlangıç parametreleri formülleri λ_1 ve λ_2 dikkate alınarak yeniden düzenlenirse aşağıdaki formülasyon elde edilir:

$$K_{yy}=\Phi_2-\frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\Phi_4 \qquad (3.41a)$$

$$K_{y\varphi}=\frac{L}{2\lambda_1\lambda_2}(\lambda_2\Phi_1+\lambda_1\Phi_3) \qquad (3.41b)$$

$$K_{yM}=-\frac{L^2}{2\lambda_1\lambda_2 EI}\Phi_4 \qquad (3.41c)$$

$$K_{yV}=\frac{L^3}{2\lambda_1\lambda_2(\lambda_1^2+\lambda_2^2)EI}(\lambda_2\Phi_1-\lambda_1\Phi_3) \qquad (3.41d)$$

$$K_{\varphi y}=\frac{1}{L}\frac{\lambda_1^2+\lambda_2^2}{2\lambda_1\lambda_2}(\lambda_2\Phi_1-\lambda_1\Phi_3) \qquad (3.42a)$$

$$K_{\varphi\varphi}=\Phi_2+\frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\Phi_4 \qquad (3.42b)$$

$$K_{\varphi M}=-\frac{L}{2\lambda_1\lambda_2 EI}(\lambda_1\Phi_3+\lambda_2\Phi_1) \qquad (3.42c)$$

$$K_{My}=\frac{EI}{L^2}\frac{(\lambda_1^4+2\lambda_1^2\lambda_2^2+\lambda_2^4)}{2\lambda_1\lambda_2}\Phi_4 \qquad (3.43a)$$

$$K_{M\varphi} = -\frac{EI}{L}\frac{1}{2\lambda_1\lambda_2}\left[\lambda_2(3\lambda_1^2-\lambda_2^2)\phi_1+\lambda_1(\lambda_1^2-3\lambda_2^2)\phi_3\right] \quad (3.43b)$$

$$K_{Vy} = \frac{EI}{L^3}\frac{\lambda_1^2+\lambda_2^2}{2\lambda_1\lambda_2}\left[\lambda_2(3\lambda_1^2-\lambda_2^2)\phi_1+\lambda_1(3\lambda_2^2-\lambda_1^2)\phi_3\right] \quad (3.44)$$

$$a_1 = K_{My}(L)+2\zeta t K_{MV}(L) = \frac{EI}{2L^2}[T1] \quad (3.45)$$

$$T1=\left[\frac{\lambda_1^4+2\lambda_1^2\lambda_2^2+\lambda_2^4}{\lambda_1\lambda_2}\phi_4(L)+\frac{\sqrt{2}\,(\lambda_1^2+\lambda_2^2)\sqrt{\lambda_1^2-\lambda_2^2}}{\lambda_1\lambda_2}\left(\lambda_2\phi_1(L)+\lambda_1\phi_3(L)\right)\right] \quad (3.46)$$

$$a_2 = K_{M\varphi}(L) = -\frac{EI}{2L}[T2] \quad (3.47)$$

$$T2=\left[\frac{\lambda_2(3\lambda_1^2-\lambda_2^2)\phi_1(L)+\lambda_1(\lambda_1^2-3\lambda_2^2)\phi_3(L)}{\lambda_1\lambda_2}\right] \quad (3.48)$$

$$a_3 = 4\zeta K_{VV}(L)+(2\zeta t)^2K_{yV}(L)+K_{Vy}(L) = \frac{EI}{2L^3}[T3] \quad (3.49)$$

$$T3=(\lambda_1^2+\lambda_2^2)\left[4\sqrt{2}\sqrt{\lambda_1^2-\lambda_2^2}\left(\phi_2(L)-\frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\phi_4(L)\right)+\frac{2(\lambda_1^2-\lambda_2^2)}{\lambda_1\lambda_2}\left(\lambda_2\phi_1(L)-\ldots\right.\right. \quad (3.50)$$

$$\left.\left.\ldots-\lambda_1\phi_3(L)\right)+\frac{1}{\lambda_1\lambda_2}\left((3\lambda_1^2-\lambda_2^2)\lambda_2\phi_1(L)+(3\lambda_2^2-\lambda_1^2)\lambda_1\phi_3(L)\right)\right]$$

Tekil kuvvet olması halinde;

$$F_y(L) = \frac{PL^3}{2EI}[TP1] \quad (3.51a)$$

$$F_M(L) = \frac{PL}{2}[TP2] \quad (3.51b)$$

$$F_V(L) = P[TP3] \quad (3.51c)$$

$$TP1=\frac{1}{\lambda_1\lambda_2(\lambda_1^2+\lambda_2^2)}[\lambda_2\phi_1(L-a)-\lambda_1\phi_3(L-a)] \qquad (3.52a)$$

$$TP2=\frac{1}{\lambda_1\lambda_2}[\lambda_2\phi_1(L-a)+\lambda_1\phi_3(L-a)] \qquad (3.52b)$$

$$TP3=\phi_2(L-a)-\frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\phi_4(L-a) \qquad (3.52c)$$

$$y_0=\frac{a_1F_M(L)-a_2[F_V(L)+2\zeta t\, F_y(L)]}{a_1^2-a_2a_3}=\frac{PL^3}{EI}[YTP] \qquad (3.53a)$$

$$YTP=\frac{T1\; TP2+T2\;(2\,TP3+\sqrt{2}\,(\lambda_1^2+\lambda_2^2)\sqrt{\lambda_1^2-\lambda_2^2}\;TP1)}{T1^2+T2\;T3} \qquad (3.53b)$$

$$\varphi_0=-\frac{a_3F_M(L)-a_1[F_V(L)+2\zeta t\, F_y(L)]}{a_1^2-a_2a_3}=\frac{PL^2}{EI}[FTP] \qquad (3.54a)$$

$$FTP=\frac{-T3\; TP2+T1\;(2\,TP3+\sqrt{2}\,(\lambda_1^2+\lambda_2^2)\sqrt{\lambda_1^2-\lambda_2^2}\;TP1}{T1^2+T2\;T3} \qquad (3.54b)$$

$$y(x)=(K_{yy}+2\zeta t\, K_{yV})\,y_0+K_{y\varphi}\varphi_0-F_y=\frac{PL^3}{EI}\xi_{yP} \qquad (3.55a)$$

$$\xi_{yP}=\left[\phi_2(x)-\frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\phi_4(x)+\frac{\sqrt{\lambda_1^2-\lambda_2^2}}{\sqrt{2}\,\lambda_1\lambda_2}(\lambda_2\phi_1(x)-\lambda_1\phi_3(x))\right]YTP+\ldots$$

$$\ldots+\frac{\lambda_2\phi_1(x)+\lambda_1\phi_3(x)}{2\lambda_1\lambda_2}FTP-\frac{\lambda_2\phi_1(x-a)-\lambda_1\phi_3(x-a)}{2\lambda_1\lambda_2} \qquad (3.55b)$$

$$\varphi(x) = (K_{\varphi y}+2\zeta t\, K_{\varphi V})\, y_0 + K_{\varphi\varphi}\varphi_0 - F_{\varphi} = \frac{PL^2}{EI}\xi_{\varphi P} \qquad (3.56a)$$

$$\xi_{\varphi P}=\left[\frac{\lambda_1^2+\lambda_2^2}{2\lambda_1\lambda_2}(\lambda_2\phi_1(x)-\lambda_1\phi_3(x)-\frac{\sqrt{\lambda_1^2-\lambda_2^2}\,(\lambda_1^2+\lambda_2^2)}{\sqrt{2}\lambda_1\lambda_2}\phi_4(x)\right]YTP+\ldots$$

$$\ldots+\left[\phi_2(x)+\frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\phi_4(x)\right]FTP+\frac{1}{2\lambda_1\lambda_2}\phi_4(x-a) \qquad (3.56b)$$

$$M(x) = (K_{My}+2\zeta t\, K_{MV})\, y_0 + K_{M\varphi}\varphi_0 - F_M = PL\,\xi_{MP} \qquad (3.57a)$$

$$\xi_{MP}=\left[\frac{\lambda_1^4+2\lambda_1^2\lambda_2^2+\lambda_2^4}{2\lambda_1\lambda_2}\phi_4(x)+\frac{(\lambda_1^2+\lambda_2^2)\sqrt{\lambda_1^2-\lambda_2^2}}{\sqrt{2}\lambda_1\lambda_2}(\lambda_2\phi_1(x)+\lambda_1\phi_3(x))\right]YTP+\ldots \qquad (3.57b)$$

$$\ldots+\frac{\lambda_2(3\lambda_1^2-\lambda_2^2)\phi_1(x)+\lambda_1(\lambda_1^2-3\lambda_2^2)\phi_3(x)}{2\lambda_1\lambda_2}FTP-\frac{\lambda_2\phi_1(x-a)+\lambda_1\phi_3(x-a)}{2\lambda_1\lambda_2}$$

$$V(x) = (K_{Vy}+2\zeta tK_{VV})\, y_0 + K_{V\varphi}\varphi_0 - F_V = P\,\xi_{VP} \qquad (3.58a)$$

$$\xi_{VP}=\left[\frac{\lambda_1^2+\lambda_2^2}{\lambda_1\lambda_2}((3\lambda_1^2-\lambda_2^2)\lambda_2\phi_1(x)+(3\lambda_2^2-\lambda_1^2)\lambda_1\phi_3(x))+\sqrt{2}(\lambda_1^2+\lambda_2^2)\sqrt{\lambda_1^2-\lambda_2^2}\ldots\right.$$

$$\left.\ldots(\phi_2(x)-\frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\phi_4(x))\right]YTP+\left[\frac{\lambda_1^4+2\lambda_1^2\lambda_2^2+\lambda_2^4}{2\lambda_1\lambda_2}\phi_4(x)\right]FTP-\ldots \qquad (3.58b)$$

$$\ldots-\phi_2(x-a)-\frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\phi_4(x-a)$$

Tekil moment olması halinde;

$$F_y(L) = \frac{ML^2}{EI}\;[TM1] \qquad (3.59a$$

$$F_M(L) = -M\;[TM2] \qquad (3.59b)$$

$$F_V(L) = -\frac{M}{L}\;[TM3] \qquad (3.59ç)$$

$$TM1 = \frac{1}{2\lambda_1\lambda_2}\phi_4(L-a) \qquad (3.60\,a)$$

$$TM2 = \phi_2(L-a) + \frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\phi_4(L-a) \qquad (3.60\,b)$$

$$TM3 = \frac{\lambda_1^2+\lambda_2^2}{2\lambda_1\lambda_2}\left[\lambda_2\phi_1(L-a) - \lambda_1\phi_3(L-a)\right] \qquad (3.60\,c)$$

$$y_0 = \frac{a_1F_M(L) - a_2\left[F_V(L) + 2\zeta t\, F_y(L)\right]}{a_1^2 - a_2a_3} - \frac{ML^2}{EI}\,[YTM] \qquad (3.61\,a)$$

$$YTM = 2\left[\frac{-T1\; TM2 + T2\;\left[-TM3 + \sqrt{2}\,(\lambda_1^2+\lambda_2^2)\sqrt{\lambda_1^2-\lambda_2^2}\; TM1\right]}{T1^2 + T2\; T3}\right] \qquad (3.61\,b)$$

$$\varphi_0 = -\frac{a_3F_M(L) - a_1\left[F_V(L) + 2\zeta t\, F_y(L)\right]}{a_1^2 - a_2a_3} - \frac{ML}{EI}\,[FTM] \qquad (3.62\,a)$$

$$FTM = 2\left[\frac{-T3\; TM2 + T1\;\left[-TM3 + \sqrt{2}\,(\lambda_1^2+\lambda_2^2)\sqrt{\lambda_1^2-\lambda_2^2}\; TM1\right]}{T1^2 + T2\; T3}\right] \qquad (3.62\,b)$$

$$y(x) = (K_{yy} + 2\zeta t\, K_{yV})\; y_0 + K_{y\varphi}\,\varphi_0 - F_y = \frac{ML^2}{EI}\,\xi_{yM} \qquad (3.63\,a)$$

$$\xi_{yM} = \left[\phi_2(x) - \frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\phi_4(x) + \frac{\sqrt{\lambda_1^2-\lambda_2^2}}{\sqrt{2}\,\lambda_1\lambda_2}\left(\lambda_2\phi_1(x) - \lambda_1\phi_3(x)\right)\right] YTM + \ldots \qquad (3.63\,b)$$

$$\ldots + \frac{1}{2\lambda_1\lambda_2}\left(\lambda_2\phi_1(x) + \lambda_1\phi_3(x)\right) FTM - \frac{1}{2\lambda_1\lambda_2}\phi_4(x-a)$$

$$\varphi(x) = (K_{\varphi y} + 2\zeta t\, K_{\varphi V})\; y_0 + K_{\varphi\varphi}\,\varphi_0 - F_\varphi = \frac{ML}{EI}\,\xi_{\varphi M} \qquad (3.64\,a)$$

$$\xi_{\varphi M}=\left[\frac{\lambda_1^2+\lambda_2^2}{2\lambda_1\lambda_2}(\lambda_2\phi_1(x)-\lambda_1\phi_3(x))-\frac{\sqrt{2}(\lambda_1^2+\lambda_2^2)\sqrt{\lambda_1^2-\lambda_2^2}}{2\lambda_1\lambda_2}\phi_4(x)\right]YTM+\ldots$$

(3.64b)

$$\ldots+\left[\phi_2(x)+\frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\phi_4(x)\right]FTM-\frac{1}{2\lambda_1\lambda_2}(\lambda_1\phi_3(x-a)+\lambda_2\phi_1(x-a))$$

$$M(x)=(K_{My}+2\zeta t K_{MY})\,y_0+K_{M\varphi}\,\varphi_0-F_M=M\xi_{MM} \qquad (3.65a)$$

$$\xi_{MM}=\left[\frac{\lambda_1^4+2\lambda_1^2\lambda_2^2+\lambda_2^4}{2\lambda_1\lambda_2}\phi_4(x)+\frac{\sqrt{2}(\lambda_1^2+\lambda_2^2)\sqrt{\lambda_1^2-\lambda_2^2}}{2\lambda_1\lambda_2}(\lambda_2\phi_1(x)+\lambda_1\phi_3(x))\right]YTM-\ldots$$

$$\ldots-\frac{1}{2\lambda_1\lambda_2}[\lambda_2(3\lambda_1^2-\lambda_2^2)\phi_1(x)+\lambda_1(\lambda_1^2-3\lambda_2^2)\phi_3(x)]\,FTM+\ldots \qquad (3.65b)$$

$$\ldots+\phi_2(x-a)+\frac{\lambda_1^2-\lambda_2^3}{2\lambda_1\lambda_2}\phi_4(x-a)$$

$$V(x)=(K_{Vy}+2\zeta t K_{VV})\,y_0+K_{V\varphi}\,\varphi_0-F_V=\frac{M}{L}\xi_{VM} \qquad (3.66a)$$

$$\xi_{VM}=\left[\frac{\lambda_1^2+\lambda_2^2}{2\lambda_1\lambda_2}[(3\lambda_1^2-\lambda_2^2)\lambda_2\phi_1(x)+(3\lambda_2^2-\lambda_1^2)\lambda_1\phi_3(x)]+\ldots\right]$$

$$\left[\ldots+\sqrt{2}(\lambda_1^2+\lambda_2^2)\sqrt{\lambda_1^2-\lambda_2^2}\left(\phi_2(x)-\frac{\lambda_1^2-\lambda_2^2}{2\lambda_1\lambda_2}\phi_4(x)\right)\right]YTM+\ldots \qquad (3.66b)$$

$$\ldots+\left[\frac{\lambda_1^4+2\lambda_1^2\lambda_2^2+\lambda_2^4}{2\lambda_1\lambda_2}\phi_4(x)\right]FTM+\frac{\lambda_1^2+\lambda_2^3}{2\lambda_1\lambda_2}[\lambda_2\phi_1(x-a)-\lambda_1\phi_3(x-a)]$$

3.6.2 Tesir Çizgisi Tablolarının Düzeni

$\lambda_1=\alpha L \quad \lambda_2=\beta L$ giriş bilgisi olarak girilmiştir. Dış yükün tekil kuvvet ve tekil moment olması durumlarında, yukarıdaki formülasyonda belirtilen ξ sayıları, dış yükün kiriş üzerinde 0.1L artımlarla gezmesi halinde, kirişin 0.1L aralıklı noktalarında, tablolardan bulunabilir. Buradan çökme, dönme, moment ve kesme kuvvetlerine geçilebilir.

$$y=\frac{PL^3}{EI}\xi_{yP} \qquad (3.67a)$$

$$\varphi=\frac{PL^2}{EI}\xi_{\varphi P} \qquad (3.67b)$$

$$M=PL\,\xi_{MP} \qquad (3.67a)$$

$$V=P\,\xi_{VP} \qquad (3.67b)$$

$$y=\frac{ML^2}{EI}\xi_{yM} \qquad (3.68a)$$

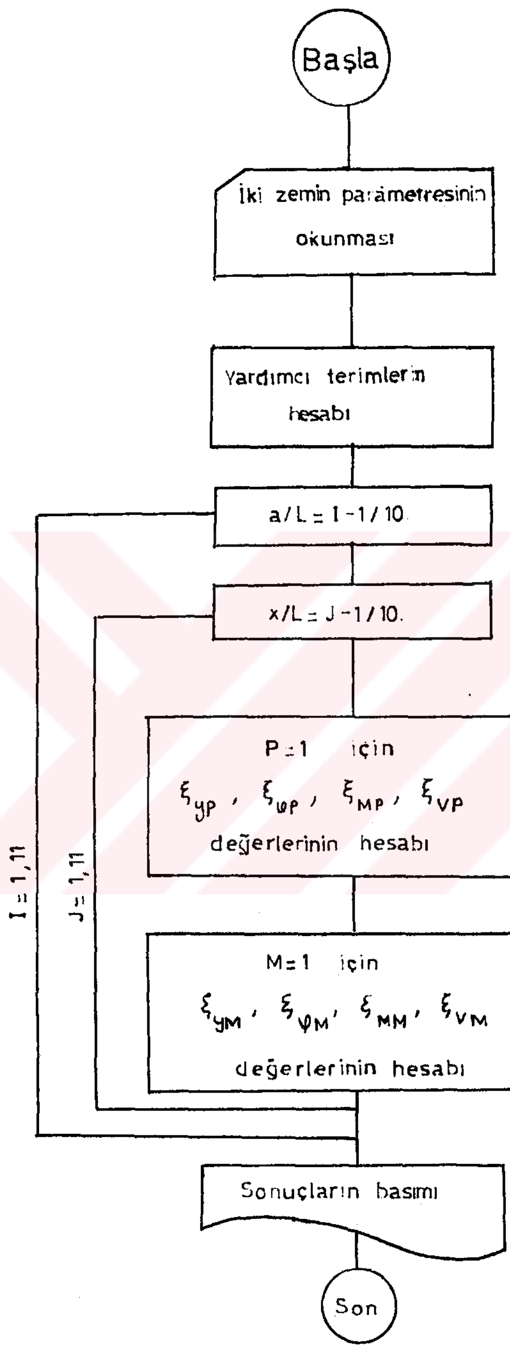
$$\varphi=\frac{ML}{EI}\xi_{\varphi M} \qquad (3.68b)$$

$$M=M\,\xi_{MM} \qquad (3.68c)$$

$$V=\frac{M}{L}\xi_{VM} \qquad (3.68d)$$

$$\alpha=\sqrt{\frac{s^2+r^2}{2}} \qquad \beta=\sqrt{\frac{s^2+r^2}{2}} \qquad (3.70)$$

2.6.3. Akış Diyagramı



BİLGİSAYAR PROGRAMI

```
C     iKi PARAMETRELi ELASTiK ZEMiNE OTURAN SONLU KiRiŞ TESiR ÇiZGiLERi
C     iÇiN ALFAL ve BETAL ye BAGLI TABLOLAR HAZIRLANMASI
C
      DIMENSION SIYP(11,11),SIFIP(11,11),SIMP(11,11),SIVP(11,11)
      DIMENSION SIYM(11,11),SIFIM(11,11),SIMM(11,11),SIVM(11,11)
      DIMENSION SIMM1(11,11),SIVP1(11,11)
C
      READ(5,10)ALAM1,ALAM2
   10 FORMAT (2F10.0)
C
C     FI(L) lerin hesabı
      FI1L=SINH(ALAM1)*COS(ALAM2)
      FI2L=COSH(ALAM1)*COS(ALAM2)
      FI3L=COSH(ALAM1)*SIN(ALAM2)
      FI4L=SINH(ALAM1)*SIN(ALAM2)
C
C     XL=X/L
C     AL=A/L
C
      satsayi=0.
      DO 300 I=1,11
      AL=(I-1)/10.
      DO 300 J=1,11
      XL=(J-1)/10.
C
C 100 FI(L-A) ların hesabı
      FI1LA=SINH((1.-AL)*ALAM1)*COS((1.-AL)*ALAM2)
      FI2LA=COSH((1.-AL)*ALAM1)*COS((1.-AL)*ALAM2)
      FI3LA=COSH((1.-AL)*ALAM1)*SIN((1.-AL)*ALAM2)
      FI4LA=SINH((1.-AL)*ALAM1)*SIN((1.-AL)*ALAM2)
C
  110 IF(XL-AL)111,112,113
  111 KATSAYI=0.
      GO TO 114
  112 KATSAYI=1.
      GO TO 114
  113 KATSAYI=1.
C
C     FI(XL-AL) lerin hesabı
  114 FI1XA=SINH((XL-AL)*ALAM1)*COS((XL-AL)*ALAM2)
      FI2XA=COSH((XL-AL)*ALAM1)*COS((XL-AL)*ALAM2)
      FI3XA=COSH((XL-AL)*ALAM1)*SIN((XL-AL)*ALAM2)
      FI4XA=SINH((XL-AL)*ALAM1)*SIN((XL-AL)*ALAM2)
C
C     FI(X) lerin hesabı
      FI1X=SINH(XL*ALAM1)*COS(XL*ALAM2)
      FI2X=COSH(XL*ALAM1)*COS(XL*ALAM2)
      FI3X=COSH(XL*ALAM1)*SIN(XL*ALAM2)
      FI4X=SINH(XL*ALAM1)*SIN(XL*ALAM2)
C
      T1=((ALAM1**4+2.*(ALAM1**2)*(ALAM2**2)+ALAM2**4)/(ALAM1*ALAM2))
     1*FI4L+SQRT(2.)*(ALAM1**2+ALAM2**2)*SQRT(ALAM1**2-ALAM2**2)*
     2(ALAM2*FI1L+ALAM1*FI3L)/(ALAM1*ALAM2)
```

```
      T2=(ALAM2*(3.*ALAM1**2-ALAM2**2)*FI1L+ALAM1*(ALAM1**2-3.*ALAM2**2)
     1*FI3L)/(ALAM1*ALAM2)
C
      T3=4*SQRT(2.)*(ALAM1**2+ALAM2**2)*SQRT(ALAM1**2-ALAM2**2)*(FI2L-
     1(ALAM1**2-ALAM2**2)/(2.*ALAM1*ALAM2)*FI4L)+(2.*(ALAM1**2+ALAM2**2)
     2*(ALAM1**2-ALAM2**2)*(ALAM2*FI1L-ALAM1*FI3L))/(ALAM1*ALAM2)+
     3(ALAM1**2+ALAM2**2)/(ALAM1*ALAM2)*((3.*ALAM1**2-ALAM2**2)*ALAM2*
     4FI1L+(3.*ALAM2**2-ALAM1**2)*ALAM1*FI3L)
C
C     TEKİL KUVVET OLMASI DURUMU
C
      TP1=(ALAM2*FI1LA-ALAM1*FI3LA)/(ALAM1*ALAM2*(ALAM1**2+ALAM2**2))
C
      TP2=(ALAM2*FI1LA+ALAM1*FI3LA)/(ALAM1*ALAM2)
C
      TP3=FI2LA-(ALAM1**2-ALAM2**2)/(2.*ALAM1*ALAM2)*FI4LA
C
      YTP=(T1*TP2+T2*(2.*TP3+SQRT(2.)*(ALAM1**2+ALAM2**2)
     1*SQRT(ALAM1**2-ALAM2**2)*TP1))/(T1**2+T2*T3)
C
      FTP=(-T3*TP2+T1*(2.*TP3+SQRT(2.)*(ALAM1**2+ALAM2**2)*SQRT(ALAM1**2
     1-ALAM2**2)*TP1))/(T1**2+T2*T3)
C
C     KSİ  DEĞERLERİNİN BULUNMASI
C
      SIYP(I,J)=(FI2X-(ALAM1**2-ALAM2**2)/(2.*ALAM1*ALAM2)*FI4X+SQRT(
     1ALAM1**2-ALAM2**2)/(SQRT(2.)*ALAM1*ALAM2)*(ALAM2*FI1X-ALAM1*FI3X)
     2)*YTP+(ALAM2*FI1X+ALAM1*FI3X)/(2.*ALAM1*ALAM2)*FTP-KATSAYI*((
     3ALAM2*FI1XA-ALAM1*FI3XA)/(2.*ALAM1*ALAM2*(ALAM1**2+ALAM2**2)))
C
      SIFIP(I,J)=((ALAM1**2+ALAM2**2)*(ALAM2*FI1X-ALAM1*FI3X)/(2.*ALAM1
     1*ALAM2)-SQRT(ALAM1**2-ALAM2**2)*(ALAM1**2+ALAM2**2)/(SQRT(2.)
     2*ALAM1*ALAM2)*FI4X)*YTP+(FI2X+(ALAM1**2-ALAM2**2)/(2.*ALAM1*ALAM2)
     3*FI4X)*FTP+KATSAYI*(FI4XA/(2.*ALAM1*ALAM2))
C
      SIMP(I,J)=((ALAM1**4+2.*ALAM1**2*ALAM2**2+ALAM2**4)*FI4X/(2.*ALAM1
     1*ALAM2)+(ALAM1**2+ALAM2**2)*SQRT(ALAM1**2-ALAM2**2)*(ALAM2*FI1X+
     2ALAM1*FI3X)/(SQRT(2.)*ALAM1*ALAM2))*YTP-(ALAM2*(3.*ALAM1**2-ALAM2
     3**2)*FI1X+ALAM1*(ALAM1**2-3.*ALAM2**2)*FI3X)/(2.*ALAM1*ALAM2)*FTP
     4-KATSAYI*((ALAM2*FI1XA+ALAM1*FI3XA)/(2.*ALAM1*ALAM2))
C
      SIVP(I,J)=((ALAM1**2+ALAM2**2)*((3.*ALAM1**2-ALAM2**2)*ALAM2*FI1X+
     1(3.*ALAM2**2-ALAM1**2)*ALAM1*FI3X)/(2.*ALAM1*ALAM2)+(2.*(ALAM1**2+
     2ALAM2**2)*SQRT(ALAM1**2-ALAM2**2)/SQRT(2.))*(FI2X-(ALAM1**2-ALAM2
     3**2)*FI4X/(2.*ALAM1*ALAM2)))*YTP+(ALAM1**4+2.*ALAM1**2*ALAM2**2+
     4ALAM2**4)*FI4X*FTP/(2.*ALAM1*ALAM2)-KATSAYI*(FI2XA-(ALAM1**2-ALAM2
     5**2)*FI4XA/(2.*ALAM1*ALAM2))-2.*(ALAM1**2-ALAM2**2)*SIFIP(I,J)
C
C
      SIVP1(I,J)=((ALAM1**2+ALAM2**2)*((3.*ALAM1**2-ALAM2**2)*ALAM2*FI1X
     1+(3.*ALAM2**2-ALAM1**2)*ALAM1*FI3X)/(2.*ALAM1*ALAM2)+(2.*(ALAM1**2
     2+ALAM2**2)*SQRT(ALAM1**2-ALAM2**2)/SQRT(2.))*(FI2X-(ALAM1**2-ALAM2
     3**2)*FI4X/(2.*ALAM1*ALAM2)))*YTP+(ALAM1**4+2*ALAM1**2*ALAM2**2+
     4ALAM2**4)*FI4X*FTP/(2.*ALAM1*ALAM2)-SATSAYI*(FI2XA-(ALAM1**2-ALAM2
     5**2)*FI4XA/(2.*ALAM1*ALAM2))-2.*(ALAM1**2-ALAM2**2)*SIFIP(I,J)
```

```
C     TEKiL MOMENT OLMASI DURUMU
  500 TM1=FI4LA/(2.*ALAM1*ALAM2)
      TM2=FI2LA+(ALAM1**2-ALAM2**2)*FI4LA/(2.*ALAM1*ALAM2)
      TM3=(ALAM1**2+ALAM2**2)/(2.*ALAM1*ALAM2)*(ALAM2*FI1LA-ALAM1
     1*FI3LA)
C
      YTM=2.*(-T1*TM2+T2*(-TM3+SQRT(2.)*(ALAM1**2+ALAM2**2)*SQRT(ALAM1
     1**2-ALAM2**2)*TM1))/(T1**2+T2*T3)
C
      FTM=2.*(T3*TM2+T1*(-TM3+SQRT(2.)*(ALAM1**2+ALAM2**2)*SQRT(ALAM1**2
     1-ALAM2**2)*TM1))/(T1**2+T2*T3)
C
C     KSi DEĞERLERiNiN BULUNMASI
C
      SIYM(I,J)=(FI2X-(ALAM1**2-ALAM2**2)*FI4X/(2.*ALAM1*ALAM2)+SQRT(
     1ALAM1**2-ALAM2**2)*(ALAM2*FI1X-ALAM1*FI3X)/(SQRT(2.)*ALAM1*ALAM2))
     2*YTM+(ALAM2*FI1X+ALAM1*FI3X)*FTM/(2.*ALAM1*ALAM2)-KATSAYI*(FI4XA/
     3(2.*ALAM1*ALAM2))
C
      SIFIM(I,J)=((ALAM1**2+ALAM2**2)*(ALAM2*FI1X-ALAM1*FI3X)/(2.*ALAM1*
     1ALAM2)-SQRT(2.)*(ALAM1**2+ALAM2**2)*SQRT(ALAM1**2-ALAM2**2)*FI4X/
     2(2.*ALAM1*ALAM2))*YTM+(FI2X+(ALAM1**2-ALAM2**2)/(2.*ALAM1*ALAM2)
     3*FI4X)*FTM-KATSAYI*((ALAM1*FI3XA+ALAM2*FI1XA)/(2.*ALAM1*ALAM2))
C
      SIMM(I,J)=((ALAM1**4+2.*ALAM1**2*ALAM2**2+ALAM2**4)/(2.*ALAM1
     1*ALAM2)*FI4X+SQRT(2.)*(ALAM1**2+ALAM2**2)*SQRT(ALAM1**2-ALAM2**2)*
     2(ALAM2*FI1X+ALAM1*FI3X)/(2.*ALAM1*ALAM2))*YTM-(ALAM2*(3.*ALAM1**2-
     3ALAM2**2)*FI1X+ALAM1*(ALAM1**2-3.*ALAM2**2)*FI3X)*FTM/(2.*ALAM1
     4*ALAM2)+KATSAYI*(FI2XA+(ALAM1**2-ALAM2**2)*FI4XA/(2.*ALAM1*ALAM2))
C
C
      SIMM1(I,J)=((ALAM1**4+2.*ALAM1**2*ALAM2**2+ALAM2**4)/(2.*ALAM1
     1*ALAM2)*FI4X+SQRT(2.)*(ALAM1**2+ALAM2**2)*SQRT(ALAM1**2-ALAM2**2)*
     2(ALAM2*FI1X+ALAM1*FI3X)/(2.*ALAM1*ALAM2))*YTM-(ALAM2*(3.*ALAM1**2-
     3ALAM2**2)*FI1X+ALAM1*(ALAM1**2-3.*ALAM2**2)*FI3X)*FTM/(2.*ALAM1
     4*ALAM2)+SATSAYI*(FI2XA+(ALAM1**2-ALAM2**2)*FI4XA/(2.*ALAM1*ALAM2))
C
      SIVM(I,J)=((ALAM1**2+ALAM2**2)/(2.*ALAM1*ALAM2)*((3.*ALAM1**2-
     1ALAM2**2)*ALAM2*FI1X+(3.*ALAM2**2-ALAM1**2)*ALAM1*FI3X)+SQRT(2.)*
     2(ALAM1**2+ALAM2**2)*SQRT(ALAM1**2-ALAM2**2)*(FI2X-(ALAM1**2-ALAM2
     3**2)*FI4X/(2.*ALAM1*ALAM2)))*YTM+(ALAM1**4+2.*ALAM1**2*ALAM2**2+
     4ALAM2**4)*FI4X/(2.*ALAM1*ALAM2)*FTM+KATSAYI*((ALAM1**2+ALAM2**2)/
     5(2.*ALAM1*ALAM2)*(ALAM2*FI1XA-ALAM1*FI3XA))-2.*(ALAM1**2-ALAM2**2)
     6*SIFIM(I,J)
  300 CONTINUE
C
      DO 400 I=1,11
  400 WRITE (6,20) (SIYP(I,J),J=1,11)
   20 FORMAT (10X,11F10.6,2X)
      WRITE (6,21)
   21 FORMAT (1H0)
      DO 410 I=1,11
  410 WRITE (6,20) (SIFIP(I,J),J=1,11)
      WRITE (6,21)
```

```
      DO 420 I=1,11
  420 WRITE (6,20) (SIMP(I,J),J=1,11)
      WRITE (6,21)
      DO 430 I=1,11
      WRITE (6,20) (SIVP1(I,J),J=1,I)
  430 WRITE (6,20) (SIVP(I,J),J=1,11)
      WRITE (6,21)
      DO 440 I=1,11
  440 WRITE (6,20) (SIYM(I,J),J=1,11)
      WRITE (6,21)
      DO 450 I=1,11
  450 WRITE (6,20) (SIFIM(I,J),J=1,11)
      WRITE (6,21)
      DO 460 I=1,11
      WRITE (6,20) (SIMM1(I,J),J=1,I)
  460 WRITE (6,20) (SIMM(I,J),J=1,11)
      WRITE (6,21)
      DO 470 I=1,11
  470 WRITE (6,20) (SIVM(I,J),J=1,11)
      WRITE (6,21)
C
  800 END
```

TABLO 3.2 a $\alpha L=1.5$ $\beta L=1.2$

ξ_{yP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.094868	.082935	.071291	.060131	.049556	.039598	.030228	.021376	.012937	.004783	-.003226
.1	.082935	.075330	.067315	.059048	.050759	.042594	.034634	.026907	.019393	.012044	.004783
.2	.071291	.067315	.062884	.057618	.051708	.045419	.038944	.032407	.025881	.019393	.012937
.3	.060131	.059048	.057618	.055413	.052082	.047848	.043016	.037813	.032407	.026907	.021376
.4	.049556	.050759	.051708	.052082	.051462	.049586	.046651	.043016	.038944	.034634	.030228
.5	.039598	.042593	.045419	.047848	.049566	.050262	.049586	.047848	.045419	.042593	.039598
.6	.030228	.034634	.038944	.043016	.046651	.049586	.051462	.052082	.051708	.050759	.049556
.7	.021376	.026907	.032407	.037813	.043016	.047848	.052082	.055413	.057618	.059048	.060131
.8	.012937	.019393	.025881	.032407	.038944	.045419	.051708	.057618	.062884	.067315	.071291
.9	.004783	.012044	.019393	.026907	.034634	.042593	.050759	.059048	.067315	.075330	.082935
1.0	-.003226	.004783	.012937	.021376	.030228	.039598	.049556	.060131	.071291	.082935	.094868

$\xi_{\psi P}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.119885	-.118290	-.114261	-.108783	-.102664	-.096551	-.090955	-.086260	-.082741	-.080575	-.079849
.1	-.075149	-.077892	-.081864	-.083093	-.082461	-.080707	-.078438	-.076144	-.074207	-.072912	-.072452
.2	-.039057	-.041210	-.048324	-.056397	-.061373	-.064080	-.065222	-.065393	-.065083	-.064684	-.064498
.3	-.010290	-.011923	-.017389	-.027572	-.038400	-.045776	-.050500	-.053268	-.054677	-.055227	-.055333
.4	.012408	.011230	.007219	-.000390	-.012427	-.024787	-.033353	-.038919	-.042187	-.043770	-.044193
.5	.030210	.029432	.026706	.021387	.012753	.000000	-.012753	-.021387	-.026706	-.029432	-.030210
.6	.044193	.043770	.042187	.038919	.033353	.024787	.012427	.000390	-.007219	-.011230	-.012408
.7	.055333	.055227	.054677	.053268	.050500	.045776	.038400	.027572	.017389	.011923	.010290
.8	.064498	.064684	.065083	.065393	.065222	.064080	.061373	.056397	.048324	.041210	.039057
.9	.072452	.072912	.074207	.076144	.078438	.080707	.082461	.083093	.081864	.077892	.075149
1.0	.079849	.080575	.082741	.086260	.090955	.096551	.102664	.108783	.114261	.118290	.119865

ξ_{MP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.029925	-.049023	-.059192	-.062115	-.059263	-.052006	-.041445	-.028638	-.014528	.000000
.1	.000000	.056746	.024408	.001641	-.013049	-.021028	-.023538	-.021706	-.016555	-.009026	.000000
.2	.000000	.044688	.099275	.063765	.037138	.018160	.005667	-.001425	-.004122	-.003356	.000000
.3	.000000	.034064	.076728	.128484	.089596	.059252	.036386	.019972	.009035	.002662	.000000
.4	.000000	.024728	.056775	.096787	.145459	.103224	.069412	.043080	.023306	.009218	.000000
.5	.000000	.016508	.039090	.068494	.105525	.151017	.105525	.068494	.039090	.016508	.000000
.6	.000000	.009218	.023306	.043080	.069413	.103224	.145459	.096787	.056775	.024728	.000000
.7	.000000	.002662	.009035	.019972	.036386	.059252	.089596	.128484	.076728	.034064	.000000
.8	.000000	-.003356	-.004122	-.001425	.005667	.018160	.037138	.063765	.099275	.044688	.000000
.9	.000000	-.009026	-.016555	-.021706	-.023539	-.021028	-.013049	.001641	.024408	.056746	.000000
1.0	.000000	-.014528	-.028638	-.041445	-.052006	-.059263	-.062115	-.059192	-.049023	-.029925	.000000

ξ_{VP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.639773										
	-.360227	-.241780	-.143356	-.062819	.001873	.052598	.091006	.118479	.136100	.144631	.144506
.1	.511253	.623476									
		-.376524	-.272932	-.184898	-.111172	-.050479	-.001604	.036551	.064912	.084202	.094908
.2	.398099	.495975	.596222								
			-.403778	-.308571	-.226023	-.155484	-.096186	-.047331	-.008154	.022019	.043726
.3	.299080	.382882	.471226	.564790							
				-.435210	-.344362	-.264296	-.194729	-.135185	-.085080	-.043802	-.010758
.4	.212643	.282859	.359163	.442236	.532380						
					-.467620	-.378649	-.299157	-.229031	-.167901	-.115227	-.070378
.5	.137034	.194259	.258626	.330800	.411218	.500000					
						-.500000	-.411218	-.330800	-.258625	-.194259	-.137034
.6	.070378	.115227	.167901	.229031	.299157	.378649	.467620				
							-.532380	-.442236	-.359163	-.282859	-.212643
.7	.010758	.043801	.085080	.135185	.194730	.264296	.344362	.435210			
								-.564790	-.471226	-.382882	-.299080
.8	-.043726	-.022019	.008153	.047331	.096186	.155484	.226023	.308571	.403778		
									-.596222	-.495975	-.398099
.9	-.094907	-.084202	-.064913	-.036551	.001604	.050480	.111172	.184898	.272932	.376524	
										-.623476	-.511253
1.0	-.144506	-.144631	-.136100	-.118479	-.091006	-.052598	-.001873	.062819	.143356	.241780	.360227
											-.639773

TABLO 3.2 b $\alpha L=1.5$ $\beta L=1.2$

ξ_{yM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.119885	-.075149	-.039057	-.010290	.012408	.030210	.044193	.055333	.064498	.072452	.079849
.1	-.118290	-.077893	-.041210	-.011923	.011230	.029432	.043770	.055227	.064684	.072912	.080575
.2	-.114261	-.081864	-.048324	-.017389	.007219	.026706	.042187	.054677	.065083	.074207	.082741
.3	-.108783	-.083093	-.056397	-.027572	-.000390	.021387	.038919	.053268	.065393	.076144	.086260
.4	-.102664	-.082461	-.061373	-.038400	-.012427	.012753	.033353	.050500	.065222	.078438	.090955
.5	-.096551	-.080707	-.064080	-.045776	-.024787	.000000	.024787	.045776	.064080	.080707	.096551
.6	-.090955	-.078438	-.065222	-.050500	-.033353	-.012753	.012427	.038400	.061373	.082461	.102664
.7	-.086260	-.076144	-.065393	-.053268	-.038919	-.021387	.000390	.027572	.056397	.083093	.108783
.8	-.082741	-.074207	-.065083	-.054677	-.042187	-.026706	-.007219	.017389	.048324	.081864	.114261
.9	-.080575	-.072912	-.064684	-.055227	-.043770	-.029432	-.011230	.011923	.041210	.077892	.118290
1.0	-.079849	-.072452	-.064498	-.055333	-.044193	-.030210	-.012408	.010290	.039057	.075149	.119885

$\xi_{\varphi M}$

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.495090	.401900	.322141	.255297	.200621	.157212	.124075	.100164	.084414	.075752	.073105
.1	.401900	.408187	.327681	.260158	.204885	.160968	.127419	.103195	.087228	.078440	.075752
.2	.322141	.327681	.345212	.275635	.218539	.173066	.138249	.113053	.096408	.087228	.084414
.3	.255297	.260158	.275635	.302929	.242786	.194691	.157719	.130861	.113053	.103195	.100164
.4	.200621	.204885	.218539	.242786	.276700	.226940	.186935	.157719	.138249	.127419	.124075
.5	.157212	.160968	.173066	.194691	.226940	.270820	.226940	.194691	.173066	.160968	.157212
.6	.124075	.127419	.138249	.157719	.186935	.226940	.278700	.242786	.218539	.204885	.200621
.7	.100164	.103195	.113053	.130861	.157719	.194691	.242786	.302929	.275635	.260158	.255297
.8	.084414	.087228	.096408	.113053	.138249	.173066	.218539	.275635	.345212	.327681	.322141
.9	.075752	.078440	.087228	.103195	.127419	.160968	.204885	.260158	.327681	.408187	.401900
1.0	.073105	.075752	.084414	.100164	.124075	.157212	.200621	.255297	.322141	.401900	.495090

ξ_{MM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000 1.000000	.864129	.731931	.606198	.488827	.381022	.283474	.196517	.120270	.054755	.000000
.1	.000000	-.128140 .871860	.739090	.612607	.494366	.385620	.287098	.199169	.121978	.055571	.000000
.2	.000000	-.113193	-.239371 .760629	.632060	.511302	.399765	.298308	.207408	.127305	.058125	.000000
.3	.000000	-.099534	-.212001	-.335571 .664429	.539747	.423707	.317407	.221528	.136479	.062545	.000000
.4	.000000	-.087478	-.187608	-.299128	-.420703 .579297	.457306	.344420	.241629	.149616	.068906	.000000
.5	.000000	-.077230	-.166709	-.267609	-.379062	-.500000 .500000	.379062	.267609	.166708	.077230	.000000
.6	.000000	-.068906	-.149616	-.241629	-.344420	-.457306	-.579297 .420703	.299128	.187608	.087478	.000000
.7	.000000	-.062545	-.136479	-.221528	-.317408	-.423707	-.539747	-.664429 .335571	.212001	.099534	.000000
.8	.000000	-.058125	-.127305	-.207408	-.298308	-.399765	-.511303	-.632061	-.760629 .239371	.113193	.000000
.9	.000000	-.055571	-.121978	-.199169	-.287098	-.385620	-.494366	-.612607	-.739090	-.871860 .128140	.000000
1.0	.000000	-.054755	-.120271	-.196517	-.283474	-.381022	-.488827	-.606198	-.731931	-.864129	-1.000000 .000000

ξ_{VM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-1.365098	-1.345852	-1.293489	-1.218040	-1.127403	-1.027573	-.922860	-.816096	-.708821	-.601454	-.493449
.1	-1.206639	-1.350457	-1.300210	-1.226230	-1.136531	-1.037205	-.932639	-.825724	-.718039	-.610028	-.501149
.2	-1.058504	-1.201066	-1.318297	-1.249531	-1.163311	-1.066034	-.962333	-.855283	-.746596	-.636791	-.525351
.3	-.924491	-1.063051	-1.183264	-1.284956	-1.205879	-1.113124	-1.011755	-.905179	-.795342	-.682902	-.567393
.4	-.807176	-.940165	-1.060362	-1.167844	-1.261035	-1.176376	-1.079724	-.974977	-.864431	-.748960	-.628181
.5	-.708147	-.834952	-.953260	-1.063326	-1.163976	-1.252434	-1.163976	-1.063327	-.953260	-.834952	-.708148
.6	-.628180	-.748960	-.864431	-.974977	-1.079724	-1.176376	-1.261036	-1.167844	-1.060362	-.940165	-.807177
.7	-.567393	-.682902	-.795342	-.905179	-1.011755	-1.113124	-1.205879	-1.284956	-1.183264	-1.063051	-.924491
.8	-.525351	-.636791	-.746596	-.855283	-.962333	-1.066034	-1.163311	-1.249531	-1.318297	-1.201066	-1.058505
.9	-.501149	-.610028	-.718039	-.825724	-.932639	-1.037205	-1.136531	-1.226230	-1.300210	-1.350457	-1.206639
1.0	-.493448	-.601455	-.708821	-.816096	-.922860	-1.027572	-1.127402	-1.218040	-1.293489	-1.345852	-1.365098

TABLO 3.3 a $\alpha L=1.5$ $\beta L=1.4$

ξ_{yP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.113894	.097236	.081007	.065480	.050791	.036964	.023936	.011585	-.000251	-.011751	-.023092
.1	.097236	.085902	.074261	.062535	.050978	.039737	.028867	.018358	.008149	-.001852	-.011751
.2	.081007	.074261	.067136	.059296	.050951	.042368	.033724	.025119	.016595	.008149	-.000251
.3	.065480	.062535	.059296	.055368	.050411	.044649	.038382	.031823	.025119	.018358	.011585
.4	.050791	.050978	.050951	.050411	.048966	.046297	.042657	.038382	.033724	.028867	.023936
.5	.036964	.039737	.042368	.044649	.046297	.046942	.046297	.044649	.042368	.039737	.036964
.6	.023936	.028867	.033724	.038382	.042657	.046297	.048966	.050411	.050951	.050978	.050791
.7	.011585	.018358	.025119	.031823	.038382	.044649	.050411	.055368	.059296	.062535	.065480
.8	-.000251	.008149	.016595	.025119	.033724	.042368	.050951	.059296	.067136	.074261	.081007
.9	-.011751	-.001852	.008149	.018358	.028867	.039737	.050978	.062535	.074261	.085902	.097236
1.0	-.023092	-.011751	-.000251	.011585	.023936	.036964	.050791	.065480	.081007	.097236	.113894

$\xi_{\varphi P}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.167392	-.165027	-.159114	-.151202	-.142541	-.134114	-.126649	-.120643	-.116375	-.113923	-.113164
.1	-.112644	-.114809	-.117365	-.116743	-.114152	-.110585	-.106825	-.103458	-.100884	-.099322	-.098819
.2	-.066897	-.068625	-.074716	-.081457	-.085007	-.086362	-.086358	-.085670	-.084816	-.084160	-.083918
.3	-.029024	-.030350	-.035083	-.044331	-.054162	-.060568	-.064430	-.066505	-.067429	-.067712	-.067740
.4	.002179	.001220	-.002263	-.009195	-.020515	-.032167	-.040061	-.045031	-.047825	-.049098	-.049413
.5	.027930	.027307	.024972	.020185	.012145	.000000	-.012145	-.020185	-.024972	-.027307	-.027930
.6	.049413	.049098	.047825	.045031	.040061	.032167	.020515	.009195	.002263	-.001220	-.002179
.7	.067740	.067712	.067429	.066505	.064430	.060568	.054162	.044331	.035083	.030350	.029024
.8	.083918	.084160	.084816	.085670	.086358	.086362	.085007	.081457	.074716	.068625	.066897
.9	.098819	.099322	.100884	.103458	.106825	.110585	.114152	.116743	.117365	.114809	.112644
1.0	.113164	.113923	.116375	.120643	.126649	.134114	.142541	.151202	.159114	.165027	.167392

ξ_{MP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.044222	-.071451	-.084720	-.086856	-.080477	-.067999	-.051660	-.033560	-.015694	.000000
.1	.000000	.046034	.007466	-.017892	-.032261	-.037774	-.036453	-.030220	-.020903	-.010258	.000000
.2	.000000	.036866	.087109	.049654	.022994	.005500	-.004451	-.008446	-.008035	-.004727	.000000
.3	.000000	.028419	.068088	.118657	.079620	.049972	.028525	.014044	.005286	.001012	.000000
.4	.000000	.020684	.050524	.089685	.138292	.096269	.063000	.037651	.019321	.007081	.000000
.5	.000000	.013601	.034325	.062757	.099461	.144936	.099461	.062757	.034325	.013601	.000000
.6	.000000	.007081	.019322	.037651	.063000	.096269	.138292	.089685	.050524	.020684	.000000
.7	.000000	.001013	.005286	.014044	.028525	.049972	.079620	.118657	.068088	.028419	.000000
.8	.000000	-.004727	-.008035	-.008446	-.004451	.005500	.022994	.049654	.087108	.036866	.000000
.9	.000000	-.010258	-.020903	-.030220	-.036453	-.037774	-.032261	-.017892	.007466	.046034	.000000
1.0	.000000	-.015694	-.033560	-.051660	-.067999	-.080477	-.086856	-.084720	-.071451	-.044222	.000000

ξ_{VP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.462260 -.537740	-.352043	-.197600	-.072489	.025400	.098156	.147685	.175591	.183098	.171003	.139674
.1	.377097	.540683 -.459317	-.315860	-.195001	-.095946	-.017675	.040885	.080734	.102694	.107345	.094991
.2	.298527	.437154	.566084 -.433916	-.317862	-.218049	-.134544	-.067113	-.015376	.021083	.042621	.049476
.3	.226778	.341014	.451796	.558912 -.441088	-.341500	-.253447	-.177567	-.114117	-.063106	-.024408	.002145
.4	.161585	.252343	.344745	.438694	.533495 -.466505	-.375154	-.291627	-.216854	-.151292	-.095067	-.048085
.5	.102315	.170658	.244808	.324770	.410149	.500000 -.500000	-.410149	-.324770	-.244808	-.170658	-.102315
.6	.048085	.095066	.151292	.216854	.291627	.375153	.466505 -.533495	-.438655	-.344745	-.252343	-.161565
.7	-.002145	.024408	.063106	.114117	.177567	.253447	.341499	.441088 -.558912	-.451796	-.341014	-.226778
.8	-.049477	-.042621	-.021083	.015376	.067113	.134544	.218049	.317862	.433916 -.566084	-.437154	-.298527
.9	-.094991	-.107345	-.102694	-.080734	-.040865	.017675	.095946	.195001	.315660	.459317 -.540683	-.377097
1.0	-.139674	-.171003	-.183098	-.175592	-.147665	-.098156	-.025400	.072489	.197600	.352043	.537740 -.462260

TABLO 3.3 b

$\alpha L=1.5 \quad \beta L=1.4$

ξ_{yM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.167392	-.112644	-.066897	-.029024	.002179	.027930	.049413	.067740	.083918	.098819	.113164
.1	-.165027	-.114809	-.068625	-.030350	.001220	.027307	.049098	.067712	.084160	.099322	.113923
.2	-.159114	-.117365	-.074716	-.035083	-.002263	.024972	.047825	.067429	.084816	.100884	.116375
.3	-.151202	-.116743	-.081457	-.044331	-.009195	.020185	.045031	.066505	.085670	.103458	.120643
.4	-.142541	-.114152	-.085007	-.054162	-.020515	.012145	.040061	.064430	.086358	.106825	.126649
.5	-.134114	-.110585	-.086362	-.060568	-.032167	.000000	.032167	.060568	.086362	.110585	.134114
.6	-.126649	-.106825	-.086358	-.064430	-.040061	-.012145	.020515	.054162	.085007	.114152	.142541
.7	-.120643	-.103458	-.085670	-.066505	-.045031	-.020185	.009195	.044331	.081457	.116743	.151202
.8	-.116375	-.100884	-.084816	-.067429	-.047825	-.024972	.002263	.035083	.074716	.117365	.159114
.9	-.113923	-.099322	-.084160	-.067712	-.049098	-.027307	-.001220	.030350	.068625	.114809	.165027
1.0	-.113164	-.098819	-.083918	-.067740	-.049413	-.027930	-.002179	.029024	.066897	.112644	.167392

$\xi_{\varphi M}$

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.595925	.500694	.416133	.343343	.282752	.234247	.197278	.170947	.154061	.145177	.142624
.1	.500694	.505244	.420332	.347186	.286259	.237456	.200242	.173722	.156706	.147751	.145177
.2	.416133	.420332	.434464	.360218	.298234	.248481	.210471	.183336	.165899	.156707	.154061
.3	.343343	.347186	.360218	.384273	.320511	.269131	.229737	.201523	.183336	.173721	.170947
.4	.282752	.286259	.298234	.320511	.354455	.300828	.259490	.229737	.210470	.200242	.197278
.5	.234247	.237456	.248481	.269131	.300828	.344579	.300828	.269131	.248481	.237456	.234247
.6	.197278	.200242	.210471	.229737	.259490	.300828	.354455	.320511	.298234	.286259	.282752
.7	.170947	.173722	.183336	.201523	.229737	.269131	.320511	.384273	.360218	.347186	.343343
.8	.154061	.156707	.165899	.183336	.210471	.248481	.298234	.360218	.434464	.420332	.416133
.9	.145177	.147751	.156707	.173722	.200242	.237456	.286259	.347186	.420332	.505244	.500694
1.0	.142624	.145177	.154061	.170947	.197278	.234247	.282752	.343343	.416133	.500694	.595925

ξ_{MM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000										
	1.000000	.901429	.787981	.667127	.544899	.426138	.314740	.213884	.126250	.054210	.000000
.1	.000000	-.095182									
		.904818	.791567	.670623	.548089	.428872	.316921	.215470	.127244	.054661	.000000
.2	.000000	-.088101	-.197512								
			.802488	.681538	.558222	.437661	.324003	.220658	.130517	.056155	.000000
.3	.000000	-.080849	-.182857	-.300344							
				.699656	.575438	.452843	.336388	.229820	.136346	.058834	.000000
.4	.000000	-.073964	-.168588	-.279239	-.401073						
					.598927	.474014	.353935	.242961	.144787	.062745	.000000
.5	.000000	-.067839	-.155672	-.259698	-.375934	-.500000					
						.500000	.375934	.259699	.155671	.067839	.000000
.6	.000000	-.062745	-.144787	-.242961	-.353935	-.474014	-.598927				
							.401073	.279239	.168588	.073964	.000000
.7	.000000	-.058834	-.136346	-.229820	-.336388	-.452843	-.575438	-.699656			
								.300344	.182857	.080850	.000000
.8	.000000	-.056155	-.130517	-.220658	-.324003	-.437661	-.558222	-.681538	-.802468		
									.197512	.088101	.000000
.9	.000000	-.054661	-.127244	-.215470	-.316921	-.426871	-.548089	-.670622	-.791566	-.904818	
										.095182	.000000
1.0	.000000	-.054210	-.126250	-.213884	-.314740	-.426138	-.544899	-.667127	-.787981	-.901429	-1.000000
											.000000

ξ_{VM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.882337	-1.073866	-1.182681	-1.224393	-1.212146	-1.156614	-1.066085	-.946601	-.802159	-.634933	-.445554
.1	-.819518	-1.070215	-1.182272	-1.226478	-1.216055	-1.161749	-1.071904	-.952613	-.807905	-.639976	-.449467
.2	-.751516	-.999030	-1.177657	-1.230803	-1.227032	-1.177316	-1.090196	-.971918	-.826627	-.656592	-.462483
.3	-.683928	-.923666	-1.107063	-1.232844	-1.242355	-1.202057	-1.120832	-1.005208	-.859533	-.686208	-.485959
.4	-.621018	-.850586	-1.034204	-1.170785	-1.257152	-1.232674	-1.161823	-1.051527	-.906440	-.729156	-.520498
.5	-.565865	-.784627	-.965719	-1.108211	-1.209245	-1.263774	-1.209245	-1.108211	-.965719	-.784627	-.565865
.6	-.520489	-.729156	-.906440	-1.051527	-1.161823	-1.232675	-1.257152	-1.170785	-1.034204	-.850586	-.621018
.7	-.485959	-.686208	-.859533	-1.005208	-1.120832	-1.202057	-1.242355	-1.232844	-1.107063	-.923666	-.683928
.8	-.462483	-.656593	-.826627	-.971918	-1.090196	-1.177316	-1.227032	-1.230803	-1.177657	-.999030	-.751516
.9	-.449467	-.639976	-.807905	-.952613	-1.071904	-1.161749	-1.216056	-1.226478	-1.182272	-1.070215	-.819518
1.0	-.445554	-.634933	-.802159	-.946602	-1.066085	-1.156614	-1.212146	-1.224393	-1.182681	-1.073865	-.882337

TABLO 3.4 a $\alpha L=2.0$ $\beta L=1.6$

ξ_{yP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.038608	.032411	.026517	.021109	.016273	.012017	.008296	.005030	.002113	-.000570	-.003140
.1	.032411	.029142	.025506	.021679	.017891	.014277	.010901	.007772	.004859	.002103	-.000570
.2	.026517	.025506	.024104	.021976	.019331	.016435	.013464	.010521	.007652	.004859	.002113
.3	.021109	.021679	.021976	.021524	.020340	.018330	.015900	.013254	.010521	.007772	.005030
.4	.016273	.017891	.019331	.020340	.020568	.019722	.018061	.015900	.013464	.010901	.008296
.5	.012017	.014277	.016435	.018330	.019722	.020278	.019722	.018330	.016435	.014277	.012017
.6	.008296	.010901	.013464	.015900	.018061	.019722	.020568	.020340	.019331	.017891	.016273
.7	.005030	.007772	.010521	.013254	.015900	.018330	.020340	.021634	.021976	.021679	.021109
.8	.002113	.004859	.007652	.010521	.013464	.016435	.019331	.021976	.024104	.025506	.026517
.9	-.000570	.002103	.004859	.007772	.010901	.014277	.017891	.021679	.025506	.029142	.032411
1.0	-.003140	-.000570	.002113	.005030	.008296	.012017	.016273	.021109	.026517	.032411	.038608

$\xi_{\varphi P}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.062551	-.060863	-.056725	-.051289	-.045426	-.039772	-.034775	-.030729	-.027803	-.026068	-.025507
.1	-.031879	-.034375	-.037784	-.038371	-.037172	-.035005	-.032501	-.030131	-.028229	-.027013	-.026598
.2	-.009524	-.011330	-.017540	-.024393	-.028067	-.029561	-.029687	-.029096	-.028286	-.027628	-.027371
.3	.006100	.004857	.000475	-.008117	-.017094	-.022608	-.025654	-.027056	-.027485	-.027466	-.027392
.4	.016432	.015641	.012744	.006852	-.003058	-.013145	-.019555	-.023289	-.025188	-.025939	-.026090
.5	.022736	.022303	.020598	.016909	.010379	.000000	-.010379	-.016909	-.020598	-.022303	-.022736
.6	.026090	.025939	.025188	.023289	.019555	.013145	.003058	-.006852	-.012744	-.015641	-.016432
.7	.027392	.027466	.027485	.027056	.025654	.022608	.017094	.008117	-.000475	-.004857	-.006100
.8	.027371	.027628	.028286	.029096	.029687	.029561	.028067	.024393	.017540	.011330	.009524
.9	.026598	.027013	.028229	.030131	.032501	.035005	.037172	.038371	.037784	.034375	.031879
1.0	.025507	.026068	.027803	.030729	.034775	.039772	.045426	.051289	.056725	.060863	.062551

ξ_{MP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.031312	-.049537	-.057735	-.058473	-.053859	-.045597	-.035056	-.023344	-.011387	.000000
.1	.000000	.052241	.018065	-.004593	-.018031	-.024266	-.025034	-.021813	-.015862	-.008267	.000000
.2	.000000	.038068	.088223	.050814	.024334	.006886	-.003276	-.007723	-.007852	-.004904	.000000
.3	.000000	.026444	.062993	.110818	.070658	.041286	.020998	.008167	.001287	-.001018	.000000
.4	.000000	.017075	.042355	.077181	.122981	.080682	.049192	.026894	.012223	.003707	.000000
.5	.000000	.009618	.025668	.049540	.082732	.126789	.082732	.049540	.025668	.009618	.000000
.6	.000000	.003707	.012223	.026894	.049192	.080682	.122981	.077181	.042355	.017075	.000000
.7	.000000	-.001018	.001287	.008167	.020998	.041286	.070658	.110818	.062993	.026444	.000000
.8	.000000	-.004904	-.007852	-.007723	-.003276	.006886	.024334	.050814	.088223	.038068	.000000
.9	.000000	-.008267	-.015862	-.021813	-.025034	-.024266	-.018031	-.004593	.018065	.052241	.000000
1.0	.000000	-.011387	-.023344	-.035056	-.045597	-.053859	-.058473	-.057735	-.049537	-.031313	.000000

ξ_{VP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.609958										
	-.390042	-.242156	-.127429	-.040804	.022534	.066920	.096056	.112931	.119770	.118030	.108411
.1	.452635	.592354									
		-.407646	-.280122	-.176883	-.095238	-.032344	.014529	.047796	.069429	.080864	.082952
.2	.322632	.439832	.564684								
			-.435316	-.316186	-.216592	-.135281	-.070578	-.020692	.016051	.041050	.055302
.3	.217434	.313124	.419835	.538721							
				-.461279	-.344791	-.245506	-.162972	-.096152	-.043744	-.004439	.022892
.4	.133837	.209651	.298189	.400726	.517644						
					-.482356	-.366255	-.266266	-.182303	-.113584	-.058968	-.017223
.5	.068301	.126138	.197192	.282753	.383669	.500000					
						-.500000	-.383668	-.282753	-.197192	-.126138	-.068301
.6	.017223	.058968	.113584	.182303	.266266	.366255	.482356				
							-.517644	-.400726	-.298189	-.209651	-.133837
.7	-.022892	.004439	.043744	.096152	.162973	.245506	.344791	.461279			
								-.538721	-.419835	-.313123	-.217434
.8	-.055302	-.041050	-.016050	.020693	.070578	.135281	.216592	.316186	.435316		
									-.564684	-.439832	-.322531
.9	-.082952	-.080864	-.069429	-.047796	-.014529	.032344	.095238	.176883	.280122	.407646	
										-.592354	-.452635
1.0	-.108411	-.118030	-.119770	-.112931	-.096056	-.066920	-.022534	.040804	.127429	.242157	.390042
											-.609958

TABLO 3.4 b $\alpha L=2.0$ $\beta L=1.6$

ξ_{yM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.062551	-.031679	-.009524	.006100	.016432	.022736	.026090	.027392	.027371	.026598	.025507
.1	-.060863	-.034375	-.011330	.004857	.015641	.022303	.025939	.027466	.027628	.027013	.026068
.2	-.056725	-.037784	-.017540	.000475	.012744	.020598	.025188	.027485	.028286	.028229	.027803
.3	-.051289	-.038371	-.024393	-.008117	.006852	.016909	.023289	.027056	.029096	.030131	.030729
.4	-.045426	-.037172	-.028067	-.017094	-.003058	.010379	.019555	.025654	.029687	.032501	.034775
.5	-.039772	-.035005	-.029561	-.022608	-.013145	.000000	.013145	.022608	.029561	.035005	.039772
.6	-.034775	-.032501	-.029687	-.025654	-.019555	-.010379	.003058	.017094	.028067	.037172	.045426
.7	-.030729	-.030131	-.029096	-.027056	-.023289	-.016909	-.006852	.008117	.024393	.038371	.051289
.8	-.027803	-.028229	-.028286	-.027485	-.025188	-.020598	-.012744	-.000475	.017540	.037784	.056725
.9	-.026068	-.027013	-.027628	-.027466	-.025939	-.022303	-.015641	-.004857	.011330	.034375	.060863
1.0	-.025507	-.026598	-.027371	-.027392	-.026090	-.022736	-.016432	-.006100	.009524	.031679	.062551

$\xi_{\varphi M}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.353882	.262389	.187360	.127524	.081225	.046643	.021932	.005328	-.004803	-.009935	-.011379
.1	.262389	.269962	.193604	.132572	.085244	.049812	.024435	.007339	-.003121	-.008435	-.009935
.2	.187360	.193604	.213737	.149058	.098545	.060454	.032967	.014302	.002785	-.003121	-.004803
.3	.127524	.132572	.149058	.178813	.122920	.080269	.049116	.027695	.014302	.007339	.005328
.4	.081225	.085244	.098545	.122920	.160046	.110952	.074541	.049116	.032967	.024435	.021932
.5	.046643	.049812	.060454	.080269	.110952	.154162	.110952	.080269	.060454	.049812	.046643
.6	.021932	.024435	.032967	.049116	.074541	.110952	.160046	.122920	.098545	.085244	.081225
.7	.005328	.007339	.014302	.027695	.049116	.080269	.122920	.178813	.149058	.132572	.127524
.8	-.004803	-.003121	.002785	.014302	.032967	.060454	.098545	.149058	.213737	.193604	.187360
.9	-.009935	-.008435	-.003121	.007339	.024435	.049812	.085244	.132572	.193604	.269962	.262389
1.0	-.011379	-.009935	-.004803	.005328	.021932	.046643	.081225	.127524	.187360	.262389	.353882

ξ_{MM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000										
	1.000000	.830922	.671803	.527719	.401311	.293433	.203727	.131084	.073995	.030821	.000000
.1	.000000	-.155251									
		.844749	.684500	.538878	.410714	.301008	.209503	.135161	.076520	.031978	.000000
.2	.000000	-.128557	-.277078								
			.722922	.573191	.440006	.324862	.227866	.148231	.084678	.035741	.000000
.3	.000000	-.104419	-.228367	-.369348							
				.630652	.489894	.366060	.259955	.171308	.099216	.042503	.000000
.4	.000000	-.083531	-.185478	-.304821	-.440227						
					.559773	.424751	.306316	.205050	.120696	.052588	.000000
.5	.000000	-.066229	-.149446	-.249674	-.366774	-.500000					
						.500000	.366774	.249674	.149445	.066229	.000000
.6	.000000	-.052588	-.120696	-.205050	-.306317	-.424751	-.559773				
							.440227	.304821	.185478	.083531	.000000
.7	.000000	-.042504	-.099216	-.171308	-.259955	-.366060	-.489895	-.630652			
								.369348	.228367	.104419	.000000
.8	.000000	-.035741	-.084678	-.148231	-.227866	-.324862	-.440006	-.573191	-.722922		
									.277078	.128557	.000000
.9	.000000	-.031978	-.076520	-.135161	-.209503	-.301008	-.410714	-.538878	-.684500	-.844749	
										.155251	.000000
1.0	.000000	-.030821	-.073995	-.131085	-.203727	-.293433	-.401311	-.527719	-.671804	-.830933	-1.000000
											.000000

ξ_{VM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-1.715545	-1.651948	-1.522262	-1.355156	-1.171676	-.986562	-.809455	-.645965	-.498592	-.357507	-.251184
.1	-1.433244	-1.660245	-1.535937	-1.371904	-1.189797	-1.004840	-.827043	-.662285	-.513242	-.380179	-.261593
.2	-1.171095	-1.392650	-1.570295	-1.418522	-1.242792	-1.059986	-.881321	-.713562	-.559977	-.421157	-.295688
.3	-.938252	-1.145890	-1.329010	-1.485722	-1.325466	-1.149976	-.972647	-.801860	-.641988	-.494250	-.357437
.4	-.739640	-.929081	-1.108239	-1.276484	-1.428097	-1.269196	-1.098619	-.927208	-.761046	-.602350	-.450307
.5	-.577103	-.747240	-.917194	-1.087220	-1.253617	-1.407893	-1.253616	-1.087220	-.917194	-.747241	-.577103
.6	-.450307	-.602360	-.761046	-.927208	-1.098619	-1.269196	-1.428097	-1.276484	-1.108239	-.929082	-.739641
.7	-.357436	-.494249	-.641988	-.801860	-.972646	-1.149976	-1.325466	-1.485722	-1.329010	-1.145890	-.938252
.8	-.295688	-.421156	-.559977	-.713562	-.881321	-1.059986	-1.242792	-1.418522	-1.570395	-1.392650	-1.171095
.9	-.261593	-.380179	-.513243	-.662285	-.827043	-1.004840	-1.189797	-1.371904	-1.535936	-1.660245	-1.433244
1.0	-.251184	-.367507	-.498592	-.645964	-.809455	-.986562	-1.171676	-1.355156	-1.522262	-1.651948	-1.715545

TABLO 3.5 a $\alpha L=2.0$ $\beta L=1.8$

ξ_{yP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.041980	.034557	.027528	.021131	.015466	.010536	.006270	.002554	-.000753	-.003798	-.006723
.1	.034557	.030383	.025904	.021331	.016908	.012768	.008957	.005463	.002229	-.000828	-.003798
.2	.027528	.025904	.023926	.021281	.018185	.014904	.011607	.008382	.005261	.002229	-.000753
.3	.021131	.021331	.021281	.020622	.019045	.016786	.014135	.011294	.008382	.005463	.002554
.4	.015466	.016908	.018185	.019045	.019140	.018172	.016398	.014135	.011607	.008957	.006270
.5	.010536	.012768	.014904	.016786	.018172	.018726	.018172	.016796	.014904	.012768	.010536
.6	.006270	.008957	.011607	.014135	.016398	.018172	.019140	.019045	.018185	.016908	.015466
.7	.002554	.005463	.008382	.011294	.014135	.016786	.019045	.020622	.021281	.021331	.021131
.8	-.000753	.002229	.005261	.008382	.011607	.014904	.018185	.021281	.023926	.025904	.027528
.9	-.003798	-.000828	.002229	.005463	.008957	.012768	.016908	.021331	.025904	.030383	.034557
1.0	-.006723	-.003798	-.000753	.002554	.006270	.010536	.015466	.021131	.027528	.034557	.041980

$\xi_{\varphi P}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.074996	-.072787	-.067401	-.060384	-.052908	-.045819	-.039690	-.034871	-.031518	-.029629	-.029055
.1	-.041045	-.043194	-.045770	-.045281	-.042960	-.039775	-.036456	-.033523	-.031310	-.029984	-.029563
.2	-.015736	-.017323	-.023030	-.029243	-.032239	-.033098	-.032701	-.031738	-.030720	-.029988	-.029728
.3	.002358	.001247	-.002850	-.011112	-.019758	-.024955	-.027722	-.028912	-.029212	-.029142	-.029063
.4	.014646	.013928	.011184	.005451	-.004336	-.014320	-.020627	-.034259	-.026074	-.026775	-.026911
.5	.022440	.022043	.020419	.016816	.010348	.000000	-.010348	-.016816	-.020419	-.022043	-.022440
.6	.026911	.026775	.026074	.034259	.020627	.014320	.004336	-.005451	-.011184	-.013928	-.014646
.7	.029063	.029142	.029212	.028912	.027722	.024955	.019758	.011112	.002850	-.001247	-.002358
.8	.029728	.029988	.030720	.031739	.032701	.033098	.032239	.029243	.023030	.017323	.015736
.9	.029563	.029984	.031310	.033523	.036456	.039775	.042960	.045281	.045770	.043194	.041045
1.0	.029055	.029629	.031518	.034871	.039690	.045819	.052908	.060384	.067401	.072787	.074996

ξ_{MP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.040896	-.064259	-.074125	-.073996	-.066844	-.055150	-.040981	-.026077	-.011953	.000000
.1	.000000	.045887	.008148	-.015874	-.028936	-.033552	-.031963	-.026145	-.017847	-.008642	.000000
.2	.000000	.034117	.082334	.044076	.017638	.001005	-.007792	-.010612	-.009189	-.005141	.000000
.3	.000000	.024115	.059781	.107501	.067383	.038257	.018506	.006448	.000412	-.001219	.000000
.4	.000000	.015795	.040697	.075744	.121907	.079668	.048144	.025937	.011533	.003391	.000000
.5	.000000	.008970	.024773	.048764	.082285	.126561	.082285	.048764	.024773	.008970	.000000
.6	.000000	.003391	.011533	.025937	.048144	.079668	.121907	.075744	.040697	.015795	.000000
.7	.000000	-.001219	.000412	.006448	.018506	.038257	.067383	.107501	.059781	.024115	.000000
.8	.000000	-.005141	-.009189	-.010611	-.007792	.001005	.017638	.044076	.082334	.034117	.000000
.9	.000000	-.008642	-.017847	-.026145	-.031963	-.033552	-.028936	-.015874	.008148	.045887	.000000
1.0	.000000	-.011953	-.026077	-.040981	-.055150	-.066844	-.073996	-.074125	-.064259	-.040896	.000000

ξ_{VP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.488711 -.511289	-.314149	-.159855	-.043298	.040928	.097991	.132455	.148047	.147526	.132643	.104171
.1	.370846	.544407 -.455593	-.304045	-.181014	-.084423	-.011627	.040122	.073330	.090029	.091626	.078840
.2	.269638	.412158	.551677 -.448323	-.320125	-.212008	-.123945	-.055085	-.004202	.029962	.049446	.051907
.3	.185031	.298056	.416141	.538882 -.461118	-.343634	-.241600	-.156234	-.087726	-.035690	.000488	.021378
.4	.115791	.201763	.298028	.404568	.519948 -.480052	-.366651	-.266187	-.180483	-.110178	-.055188	-.015065
.5	.059936	.121632	.196696	.285383	.387115	.500000 -.500000	-.387115	-.285383	-.196696	-.121632	-.059936
.6	.015065	.055188	.110178	.180483	.266187	.366651	.480051 -.519949	-.404568	-.298028	-.201764	-.115791
.7	-.021378	-.000488	.035690	.087726	.156234	.241600	.343634	.461118 -.538882	-.416141	-.298056	-.185031
.8	-.051907	-.048446	-.029962	.004202	.055085	.123945	.212008	.320125	.448323 -.551678	-.412158	-.269638
.9	-.078840	-.091626	-.090029	-.073331	-.040122	.011627	.084423	.181014	.304045	.455593 -.544407	-.370846
1.0	-.104172	-.132644	-.147526	-.148047	-.132456	-.097991	-.040928	.043298	.159855	.314149	.511289 -.488711

TABLO 3.5 b $\alpha L=2.0 \quad \beta L=1.8$

ξ_{yM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.074996	-.041045	-.015736	.002358	.014646	.022440	.026911	.029063	.029728	.029562	.029055
.1	-.072787	-.043194	-.017323	.001247	.013928	.022043	.026775	.029142	.029988	.029984	.029629
.2	-.067401	-.045770	-.023030	-.002850	.011184	.020419	.026074	.029212	.030720	.031310	.021518
.3	-.060384	-.045281	-.029243	-.011112	.005451	.016816	.024259	.028912	.031730	.033523	.034871
.4	-.052908	-.042960	-.032239	-.019758	-.004336	.010348	.020627	.027722	.032701	.036456	.039690
.5	-.045819	-.039775	-.033098	-.024955	-.014320	.000000	.014320	.024955	.033098	.039775	.045819
.6	-.039690	-.036456	-.032701	-.027722	-.020627	-.010348	.004336	.019758	.032239	.042960	.052908
.7	-.034871	-.033523	-.031739	-.028912	-.024259	-.016816	-.005451	.011112	.029243	.045281	.060384
.8	-.031518	-.031310	-.030720	-.029212	-.026074	-.020419	-.011184	.002850	.023030	.045770	.067401
.9	-.029629	-.029934	-.029988	-.029142	-.026775	-.022043	-.013928	-.001247	.017323	.043194	.072787
1.0	-.029055	-.029563	-.029728	-.029063	-.026911	-.022440	-.014646	-.002358	.015736	.041045	.074996

$\xi_{\varphi M}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.387327	.293948	.214620	.149627	.098331	.059504	.031583	.012848	.001544	-.004043	-.005555
.1	.293948	.300009	.219808	.153960	.101885	.062392	.033937	.014806	.003239	-.002490	-.004043
.2	.214620	.219808	.237240	.168739	.114190	.072545	.042340	.021895	.009449	.003239	.001544
.3	.149627	.153960	.168739	.196146	.137408	.092029	.058733	.035935	.021895	.014806	.012848
.4	.098331	.101885	.114190	.137408	.173256	.122664	.084951	.058733	.042340	.033937	.031583
.5	.059504	.062392	.072545	.092029	.122664	.165947	.122664	.092029	.072545	.062392	.059504
.6	.031583	.033937	.042340	.058733	.084951	.122664	.173256	.137408	.114190	.101885	.098331
.7	.012848	.014806	.021895	.035935	.058733	.092029	.137408	.196146	.168739	.153960	.149627
.8	.001544	.003239	.009449	.021895	.042340	.072545	.114190	.168739	.237240	.219808	.214620
.9	-.004043	-.002490	.003239	.014806	.033937	.062392	.101885	.153960	.219808	.300009	.293948
1.0	-.005555	-.004043	.001544	.012848	.031583	.059504	.098331	.149627	.214620	.293948	.387327

ξ_{MM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000										
	1.000000	.864968	.721181	.579795	.448217	.330952	.230356	.147290	.081653	.032826	.000000
.1	.000000	-.126454									
		.872546	.729944	.588041	.455484	.336970	.235006	.150568	.083650	.033708	.000000
.2	.000000	-.108826	-.243283								
			.756717	.613969	.478800	.356579	.250345	.161497	.090367	.036697	.000000
.3	.000000	-.091371	-.207858	-.342766							
				.657234	.518819	.390934	.277653	.181209	.102517	.042200	.000000
.4	.000000	-.075352	-.174364	-.292874	-.426083						
					.573917	.439526	.317062	.210111	.120815	.050458	.000000
.5	.000000	-.061570	-.144926	-.247795	-.367424	-.500000					
						.500000	.367424	.247795	.144926	.061570	.000000
.6	.000000	-.050468	-.120815	-.210111	-.317062	-.439526	-.573917				
							.426083	.292874	.174364	.075352	.000000
.7	.000000	-.042199	-.102617	-.181208	-.277653	-.390934	-.518819	-.657234			
								.342766	.207858	.091371	.000000
.8	.000000	-.036696	-.090367	-.161497	-.250345	-.356579	-.478800	-.613969	-.756717		
									.243283	.108826	.000000
.9	.000000	-.033708	-.083650	-.150568	-.235006	-.336969	-.455484	-.588041	-.729944	-.873546	
										.126454	.000000
1.0	.000000	-.032826	-.081653	-.147289	-.230356	-.330952	-.448217	-.579795	-.721181	-.864968	-1.000000
											.000000

ξ_{VM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-1.258155	-1.416256	-1.441039	-1.374475	-1.249698	-1.091787	-.918785	-.742788	-.571029	-.406900	-.250907
.1	-1.096501	-1.409949	-1.443149	-1.382320	-1.261121	-1.105092	-.932652	-.756187	-.583131	-.416994	-.258327
.2	-.927845	-1.222560	-1.440133	-1.400847	-1.292708	-1.145762	-.976679	-.799812	-.623278	-.450996	-.283681
.3	-.766428	-1.050136	-1.268565	-1.417185	-1.340175	-1.210859	-1.051142	-.876139	-.695227	-.513100	-.330787
.4	-.621725	-.878539	-1.094857	-1.267449	-1.386550	-1.291781	-1.151630	-.983918	-.799925	-.605535	-.402285
.5	-.499427	-.728272	-.935136	-1.117750	-1.268587	-1.373799	-1.268587	-1.117750	-.935137	-.728272	-.499427
.6	-.402285	-.605535	-.799925	-.983918	-1.151631	-1.291781	-1.386649	-1.267449	-1.094867	-.878539	-.621725
.7	-.330787	-.513100	-.695227	-.876139	-1.051143	-1.210859	-1.340175	-1.417186	-1.268565	-1.050136	-.766428
.8	-.283681	-.450996	-.623277	-.799812	-.976679	-1.145762	-1.292708	-1.400847	-1.440133	-1.222560	-.927845
.9	-.258327	-.416993	-.583131	-.756188	-.932652	-1.105092	-1.261121	-1.382320	-1.443150	-1.409950	-1.096501
1.0	-.250907	-.406899	-.571028	-.742788	-.918785	-1.091787	-1.249698	-1.374475	-1.441040	-1.416267	-1.258155

TABLO 3.6 a $\alpha L=2.5$ $\beta L=2.0$

ξ_{yP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.019411	.015527	.011959	.008840	.006235	.004128	.002461	.001151	.000102	-.000780	-.001563
.1	.015537	.013880	.011886	.009737	.007653	.005754	.004086	.002644	.001393	.000273	-.000780
.2	.011959	.011886	.011474	.010425	.008958	.007334	.005711	.004170	.002735	.001393	.000102
.3	.008840	.009737	.010425	.010590	.009954	.008762	.007295	.005732	.004170	.002644	.001151
.4	.006235	.007653	.008958	.009954	.010340	.009849	.008736	.007295	.005711	.004086	.002461
.5	.004128	.005754	.007334	.008762	.009849	.010298	.009849	.008762	.007334	.005754	.004128
.6	.002461	.004086	.005711	.007295	.008736	.009849	.010340	.009954	.008958	.007653	.006235
.7	.001151	.002644	.004170	.005732	.007295	.008762	.009954	.010590	.010425	.009737	.008840
.8	.000102	.001393	.002735	.004170	.005711	.007334	.008958	.010425	.011474	.011886	.011959
.9	-.000780	.000273	.001393	.002644	.004086	.005754	.007653	.009737	.011886	.013880	.015537
1.0	-.001563	-.000780	.000102	.001151	.002461	.004128	.006235	.008840	.011959	.015537	.019411

$\xi_{\psi P}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.039324	-.037625	-.033653	-.028648	-.023490	-.018742	-.014736	-.011637	-.009496	-.008283	-.007908
.1	-.015616	-.016134	-.021191	-.021434	-.020044	-.017866	-.015509	-.013384	-.011751	-.010748	-.010419
.2	-.000249	-.001769	-.007237	-.013111	-.015794	-.016429	-.015903	-.014880	-.013636	-.013086	-.012815
.3	.009260	.008346	.004891	-.002323	-.009711	-.013672	-.015371	-.015732	-.015458	-.015058	-.014875
.4	.014325	.013862	.011911	.007515	-.000519	-.008607	-.013159	-.015361	-.016159	-.016273	-.016225
.5	.016307	.016145	.015277	.012971	.008277	.000000	-.008277	-.012971	-.015277	-.016145	-.016307
.6	.016225	.016273	.016159	.015361	.013159	.008607	.000519	-.007515	-.011911	-.013862	-.014325
.7	.014875	.015058	.015458	.015732	.015271	.013672	.009711	.002323	-.004891	-.008346	-.009260
.8	.012815	.013086	.013636	.014880	.015903	.016429	.015794	.013111	.007237	.001769	.000249
.9	.010419	.010748	.011751	.013384	.015509	.017866	.020044	.021434	.021191	.018134	.015616
1.0	.007908	.008283	.009496	.011637	.014736	.018742	.023490	.028648	.033653	.037625	.039324

ξ_{MP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.030652	-.046687	-.051978	-.050248	-.044170	-.035694	-.026204	-.016660	-.007748	.000000
.1	.000000	.049118	.014307	-.007337	-.019038	-.023511	-.022958	-.019113	-.013335	-.006659	.000000
.2	.000000	.032612	.079202	.040657	.014906	-.000739	-.008682	-.010987	-.009382	-.005307	.000000
.3	.000000	.019990	.051133	.095524	.054592	.026565	.008954	-.000568	-.004070	-.003355	.000000
.4	.000000	.010698	.029940	.059955	.103122	.061018	.032003	.013618	.003529	-.000381	.000000
.5	.000000	.004113	.014476	.033214	.062663	.105273	.062663	.033214	.014476	.004113	.000000
.6	.000000	-.000381	.003529	.013618	.032003	.061018	.103122	.059955	.029940	.010698	.000000
.7	.000000	-.003355	-.004070	-.000568	.008954	.026565	.054592	.095524	.051133	.019990	.000000
.8	.000000	-.005308	-.009382	-.010987	-.008682	-.000739	.014906	.040657	.079202	.032612	.000000
.9	.000000	-.006659	-.013335	-.019113	-.022958	-.023511	-.019038	-.007337	.014307	.049118	.000000
1.0	.000000	-.007748	-.016660	-.026204	-.035694	-.044170	-.050248	-.051978	-.046687	-.030652	.000000

ξ_{VP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.599010 -.400990	-.225158	-.098965	-.012664	.042845	.075500	.091734	.096493	.093254	.084130	.069999
.1	.408993	.574165 -.425835	-.276507	-.151761	-.076783	-.016342	.024534	.050141	.063955	.068006	.063835
.2	.261160	.393396	.541189 -.458811	-.316825	-.202698	-.114204	-.048093	-.000882	.030597	.048842	.055450
.3	.150544	.252326	.374086	.517571 -.482429	-.340615	-.224127	-.131985	-.061896	-.011140	.022822	.041916
.4	.071058	.146180	.242394	.361905	.505370 -.494630	-.351475	-.232962	-.138644	-.066656	-.014680	.019495
.5	.016378	.069033	.141771	.236898	.356197	.500000 -.500000	-.356197	-.236898	-.141771	-.069033	-.016378
.6	-.019495	.014680	.066666	.138644	.232962	.351475	.494630 -.505370	-.361905	-.242394	-.146180	-.071058
.7	-.041916	-.022822	.011140	.061896	.131984	.224127	.340615	.482429 -.517571	-.374086	-.252326	-.150544
.8	-.055450	-.048842	-.030597	.000863	.048093	.114204	.202698	.316825	.458811 -.541189	-.393396	-.261160
.9	-.063835	-.068006	-.063955	-.050141	-.024533	.016342	.076783	.151761	.276507	.425835 -.574165	-.408993
1.0	-.069999	-.084131	-.093254	-.096493	-.091734	-.075500	-.042845	.012664	.098965	.225158	.400990 -.599010

TABLO 3.6 b

$\alpha L=2.5$ $\beta L=2.0$

ξ_{yM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.039324	-.015816	-.000249	.009260	.014335	.016307	.016225	.014875	.012815	.010419	.007908
.1	-.037535	-.018124	-.001769	.008346	.013862	.016145	.016273	.015058	.013086	.010748	.008283
.2	-.033653	-.021181	-.007237	.004891	.011911	.015277	.016159	.015458	.013836	.011751	.009496
.3	-.028648	-.021424	-.013111	-.002323	.007515	.012971	.015361	.015732	.014880	.013384	.011637
.4	-.023490	-.020044	-.015794	-.009711	-.000519	.008277	.013159	.015371	.015903	.015509	.014736
.5	-.018742	-.017866	-.016429	-.013672	-.008607	.000000	.008607	.013672	.016429	.017866	.018742
.6	-.014736	-.015509	-.015903	-.015371	-.013159	-.008277	.000519	.009711	.015794	.020044	.023490
.7	-.011637	-.013384	-.014880	-.015732	-.015361	-.012971	-.007515	.002323	.013111	.021424	.028648
.8	-.009496	-.011751	-.013836	-.015458	-.016159	-.015277	-.011911	-.004891	.007237	.021181	.033653
.9	-.008283	-.010748	-.013086	-.015058	-.015273	-.016145	-.013862	-.008346	.001769	.018124	.037535
1.0	-.007908	-.010419	-.012815	-.014875	-.016225	-.016307	-.014335	-.009260	.000249	.015816	.039324

$\xi_{\varphi M}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.281575	.192049	.122440	.070450	.033257	.007936	-.008272	-.017815	-.022763	-.024800	-.025242
.1	.192049	.201069	.129414	.075639	.036969	.010486	-.006589	-.016735	-.022064	-.024299	-.024800
.2	.122440	.129414	.152362	.093076	.049744	.019523	-.000385	-.012537	-.019149	-.022064	-.022763
.3	.070450	.075639	.093076	.125369	.074048	.037264	.012275	-.003540	-.012537	-.016735	-.017815
.4	.033257	.036969	.049744	.074048	.112324	.066097	.033613	.012276	-.000385	-.006589	-.008273
.5	.007936	.010486	.019523	.037264	.066097	.108499	.066097	.037264	.019523	.010486	.007936
.6	-.008272	-.006589	-.000385	.012275	.033613	.066097	.112324	.074048	.049744	.036969	.033257
.7	-.017815	-.016735	-.012537	-.003540	.012275	.037264	.074048	.125369	.093076	.075639	.070450
.8	-.022763	-.022064	-.019149	-.012537	-.000385	.019523	.049744	.093076	.152362	.129414	.122440
.9	-.024800	-.024299	-.022064	-.016735	-.006589	.010486	.036969	.075639	.129414	.201069	.192049
1.0	-.025242	-.024800	-.022763	-.017815	-.008272	.007936	.033257	.070450	.122440	.192049	.281575

ξ_{MM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000										
	1.000000	.792564	.603553	.441012	.307769	.203273	.124978	.069328	.032434	.010492	.000000
.1	.000000	-.185976									
		.814024	.622833	.457362	.320950	.213370	.132267	.074183	.035263	.011705	.000000
.2	.000000	-.144819	-.318388								
			.681612	.508456	.362977	.246135	.156303	.090435	.044873	.015889	.000000
.3	.000000	-.108560	-.244530	-.405157							
				.594843	.435966	.304325	.199841	.120407	.062896	.023862	.000000
.4	.000000	-.078334	-.181275	-.308901	-.460449						
					.539551	.389208	.264831	.166061	.090855	.036443	.000000
.5	.000000	-.054396	-.130041	-.228771	-.352051	-.500000					
						.500000	.352051	.228771	.130041	.054396	.000000
.6	.000000	-.036443	-.090855	-.166061	-.264831	-.389208	-.539551				
							.460449	.308901	.181275	.078334	.000000
.7	.000000	-.023863	-.062896	-.120407	-.199841	-.304325	-.435966	-.594843			
								.405157	.244530	.108560	.000000
.8	.000000	-.015889	-.044873	-.090435	-.156303	-.246124	-.362977	-.508456	-.681612		
									.318388	.144819	.000000
.9	.000000	-.011705	-.035263	-.074183	-.132267	-.212370	-.320950	-.457362	-.622833	-.814024	
										.185976	.000000
1.0	.000000	-.010491	-.032434	-.069328	-.124978	-.203273	-.307769	-.441012	-.603553	-.792564	-1.000000
											.000000

ξ_{VM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-2.122123	-2.001072	-1.766127	-1.480289	-1.185720	-.908597	-.663348	-.456202	-.288047	-.155555	-.058355
.1	-1.682530	-2.016865	-1.792700	-1.511463	-1.217406	-.938282	-.689656	-.478528	-.306240	-.170782	-.068515
.2	-1.282706	-1.602744	-1.857295	-1.597643	-1.310600	-1.029147	-.772688	-.550858	-.366647	-.218868	-.104050
.3	-.939927	-1.226811	-1.498267	-1.717487	-1.454777	-1.178413	-.914946	-.679058	-.476978	-.309246	-.172858
.4	-.660416	-.906133	-1.152998	-1.398473	-1.627802	-1.374983	-1.113362	-.865606	-.643243	-.449776	-.283179
.5	-.443233	-.647237	-.868850	-1.108357	-1.357657	-1.597383	-1.357657	-1.108357	-.868850	-.647237	-.443233
.6	-.283178	-.449776	-.643243	-.865606	-1.113362	-1.374983	-1.627802	-1.398473	-1.152998	-.906133	-.660416
.7	-.172858	-.309246	-.476978	-.679057	-.914946	-1.178413	-1.454777	-1.717487	-1.498267	-1.226811	-.939927
.8	-.104050	-.218858	-.366647	-.550858	-.772688	-1.029147	-1.310600	-1.597643	-1.857295	-1.602744	-1.282706
.9	-.068514	-.170782	-.306240	-.478528	-.689656	-.938282	-1.217405	-1.511462	-1.792700	-2.016865	-1.682530
1.0	-.058355	-.155556	-.288048	-.456202	-.662348	-.908597	-1.185720	-1.480288	-1.766127	-2.001072	-2.122123

TABLO 3.7 a $\alpha L=2.5$ $\beta L=2.2$

ξ_{yP}

s/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.020428	.016025	.011986	.008506	.005649	.003389	.001647	.000316	-.000722	-.001579	-.002356
.1	.016025	.014016	.011709	.009309	.007045	.005030	.003299	.001834	.000580	-.000533	-.001579
.2	.011986	.011709	.011115	.009913	.008330	.006624	.004950	.003381	.001932	.000580	-.000722
.3	.008506	.009309	.009913	.010006	.009309	.008066	.006560	.004967	.003381	.001834	.000316
.4	.005649	.007045	.008330	.009309	.009677	.009164	.008027	.006560	.004950	.003299	.001647
.5	.003389	.005030	.006624	.008066	.009164	.009517	.009164	.008066	.006624	.005030	.003389
.6	.001647	.003299	.004950	.006560	.008027	.009164	.009677	.009309	.008330	.007045	.005649
.7	.000316	.001834	.003381	.004967	.006560	.008066	.009309	.010006	.009913	.009309	.008506
.8	-.000722	.000580	.001932	.003381	.004950	.006624	.008330	.009913	.011115	.011709	.011986
.9	-.001579	-.000533	.000580	.001834	.003299	.005030	.007045	.009309	.011709	.014016	.016025
1.0	-.002356	-.001579	-.000722	.000316	.001647	.003389	.005649	.008506	.011986	.016025	.020428

$\xi_{\varphi P}$

s/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.044753	-.042676	-.037797	-.031704	-.025487	-.019844	-.015172	-.011648	-.009296	-.008022	-.007650
.1	-.019423	-.021512	-.024021	-.023594	-.021515	-.018733	-.015912	-.013490	-.011710	-.010673	-.010353
.2	-.002326	-.003722	-.008920	-.014459	-.016783	-.017080	-.016280	-.015076	-.013945	-.013184	-.012926
.3	.008305	.007450	.004111	-.002991	-.010273	-.014120	-.015710	-.015991	-.015681	-.015287	-.015117
.4	.014093	.013648	.011731	.007346	-.000715	-.008342	-.013413	-.015617	-.016415	-.016540	-.016502
.5	.016453	.016292	.015422	.013102	.008360	.000000	-.008360	-.013102	-.015422	-.016292	-.016453
.6	.016502	.016540	.016415	.015617	.013413	.008342	.000715	-.007346	-.011731	-.013648	-.014093
.7	.015117	.015287	.015681	.015991	.015710	.014120	.010273	.002991	-.004111	-.007450	-.008305
.8	.012926	.013184	.013945	.015076	.016280	.017080	.016783	.014459	.008920	.003722	.002326
.9	.010353	.010673	.011710	.013490	.015913	.018733	.021515	.023594	.024021	.021512	.019423
1.0	.007650	.008022	.009296	.011648	.015172	.019844	.025487	.031704	.037797	.042676	.044753

ξ_{MP}

s/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.037690	-.057058	-.063004	-.060181	-.052035	-.041128	-.029310	-.017902	-.007870	.000000
.1	.000000	.044963	.007969	-.014375	-.025634	-.028908	-.026769	-.021292	-.014135	-.006648	.000000
.2	.000000	.030423	.076109	.037108	.011339	-.003853	-.010985	-.012313	-.009810	-.005191	.000000
.3	.000000	.018974	.049941	.094488	.053484	.025412	.007975	-.001157	-.004198	-.003186	.000000
.4	.000000	.010345	.029656	.060043	.103540	.061327	.032080	.013603	.003582	-.000239	.000000
.5	.000000	.004106	.014523	.033502	.063336	.106192	.063336	.033502	.014523	.004106	.000000
.6	.000000	-.000239	.003582	.013603	.032080	.061327	.103540	.060043	.029656	.010345	.000000
.7	.000000	-.003186	-.004198	-.001157	.007975	.025412	.053484	.094488	.049941	.018974	.000000
.8	.000000	-.005191	-.009810	-.012313	-.010985	-.003853	.011339	.037108	.076109	.030423	.000000
.9	.000000	-.006648	-.014135	-.021292	-.026769	-.028908	-.025634	-.014375	.007969	.044963	.000000
1.0	.000000	-.007870	-.017902	-.029310	-.041128	-.052035	-.060181	-.063004	-.057058	-.037690	.000000

ξ_{VP}

s/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.506542 -.493358	-.275262	-.117271	-.009069	.059804	.098887	.116201	.117977	.108608	.090728	.065450
.1	.353217	.544056 -.455944	-.290423	-.152425	-.067935	-.001818	.041157	.065628	.075277	.072531	.058603
.2	.229775	.379551	.535095 -.464905	-.319409	-.200429	-.107618	-.038782	.008928	.038297	.051516	.049890
.3	.134936	.247037	.375001	.518246 -.481754	-.341698	-.222615	-.129029	-.057323	-.006892	.024020	.030742
.4	.065437	.144811	.244953	.366229	.506538 -.493462	-.353855	-.234787	-.138648	-.065538	-.014448	.015860
.5	.016714	.068954	.143156	.240269	.360078	.500000 -.500000	-.360078	-.240269	-.143156	-.068954	-.016714
.6	-.015860	.014448	.065528	.138649	.234787	.353856	.493462 -.506538	-.366229	-.244953	-.144811	-.065437
.7	-.030742	-.024020	.006892	.057323	.129029	.222615	.341699	.481754 -.518246	-.375001	-.247037	-.134936
.8	-.049890	-.051518	-.038297	-.008928	.038782	.107618	.200429	.319409	.464905 -.535095	-.379551	-.229775
.9	-.058603	-.072530	-.075276	-.065627	-.041157	.001818	.067935	.152425	.290423	.455944 -.544056	-.353217
1.0	-.065450	-.090728	-.108608	-.117977	-.116201	-.098887	-.059804	.009069	.117271	.275262	.493358 -.506542

TABLO 3.7 b $\alpha L=2.5 \quad \beta L=2.2$

ξ_{yM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.044752	-.019423	-.002326	.008305	.014099	.016453	.016502	.015117	.013526	.010353	.007649
.1	-.042676	-.021512	-.003723	.007450	.013648	.016292	.016540	.015287	.013184	.010673	.008022
.2	-.037797	-.024021	-.008920	.004111	.011731	.015422	.016415	.015681	.013945	.011710	.009296
.3	-.031704	-.022594	-.014459	-.002991	.007348	.013102	.015617	.015991	.015076	.013450	.011648
.4	-.025487	-.021515	-.016783	-.010273	-.000715	.008360	.013413	.015710	.016280	.015913	.015172
.5	-.019844	-.018723	-.017080	-.014120	-.008842	.000000	.008842	.014120	.017080	.018723	.019844
.6	-.015172	-.015913	-.016280	-.015710	-.013413	-.008360	.000715	.010273	.016783	.021515	.025487
.7	-.011648	-.013450	-.015076	-.015991	-.015617	-.013102	-.007348	.002991	.014459	.022594	.031704
.8	-.009296	-.011710	-.013945	-.015681	-.016415	-.015422	-.011731	-.004111	.008920	.024021	.037797
.9	-.008022	-.010673	-.013184	-.015287	-.016540	-.016292	-.013648	-.007450	.003723	.021512	.042676
1.0	-.007650	-.010353	-.012926	-.015117	-.016502	-.016453	-.014099	-.008305	.002326	.019423	.044752

$\xi_{\varphi M}$

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.300405	.209132	.135770	.079587	.038627	.010351	-.007925	-.018747	-.024370	-.026682	-.027183
.1	.209132	.216839	.141923	.084281	.042055	.012751	-.006305	-.017676	-.023643	-.026132	-.026682
.2	.135770	.141923	.162813	.100602	.054287	.021583	-.000108	-.013361	-.020530	-.023643	-.024370
.3	.079587	.084281	.100602	.131356	.078029	.039304	.012827	-.003921	-.013361	-.017676	-.018747
.4	.038627	.042055	.054287	.078029	.115619	.068337	.034836	.012827	-.000108	-.006305	-.007925
.5	.010351	.012751	.021583	.039304	.068337	.110919	.068337	.039304	.021583	.012751	.010351
.6	-.007925	-.006305	-.000108	.012827	.034836	.068337	.115619	.078029	.054287	.042055	.038627
.7	-.018747	-.017676	-.013361	-.003921	.012827	.039304	.078029	.131356	.100602	.084281	.079587
.8	-.024370	-.023643	-.020530	-.013361	-.000108	.021583	.054287	.100602	.162813	.141923	.135770
.9	-.026682	-.026132	-.023643	-.017676	-.006305	.012751	.042055	.084281	.141923	.216839	.209132
1.0	-.027183	-.026682	-.024370	-.018747	-.007925	.010351	.038627	.079587	.135770	.209132	.300405

ξ_{MM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000										
	1.000000	.823371	.645227	.481791	.341717	.228331	.141448	.078760	.035853	.011884	.000000
.1	.000000	-.161101									
		.838899	.660512	.495527	.353223	.237366	.148057	.083170	.039393	.012941	.000000
.2	.000000	-.129688	-.292520								
			.707480	.529304	.390886	.267577	.170568	.098440	.048325	.016717	.000000
.3	.000000	-.099770	-.231342	-.387040							
				.612960	.456651	.321838	.211944	.127073	.065377	.024047	.000000
.4	.000000	-.073544	-.175614	-.303155	-.451619						
					.548382	.400355	.273539	.170709	.091895	.035654	.000000
.5	.000000	-.052078	-.129666	-.229814	-.354627	-.500000					
						.500000	.354627	.229814	.129666	.052078	.000000
.6	.000000	-.035654	-.091895	-.170709	-.273539	-.400355	-.548382				
							.451618	.303155	.175614	.073544	.000000
.7	.000000	-.024047	-.065377	-.127073	-.211944	-.321838	-.456651	-.612960			
								.387040	.231342	.099770	.000000
.8	.000000	-.016717	-.048325	-.098440	-.170568	-.267577	-.390886	-.539304	-.707480		
									.292520	.129688	.000000
.9	.000000	-.012941	-.039393	-.083170	-.148057	-.237366	-.353223	-.495527	-.660512	-.838900	
										.161100	.000000
1.0	.000000	-.011884	-.035853	-.078760	-.141448	-.228331	-.341717	-.481791	-.645227	-.823371	-1.000000
											.000000

ξ_{VM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-1.680574	-1.809465	-1.727513	-1.526859	-1.269386	-.998872	-.742808	-.516747	-.327672	-.177969	-.065805
.1	-1.384519	-1.801755	-1.737594	-1.546622	-1.293484	-1.023736	-.766156	-.537219	-.344703	-.190723	-.074153
.2	-1.085778	-1.484895	-1.748507	-1.596271	-1.363502	-1.100953	-.841786	-.605692	-.402548	-.235696	-.104292
.3	-.814669	-1.168629	-1.450325	-1.647513	-1.464880	-1.225960	-.971984	-.728673	-.510042	-.321777	-.164066
.4	-.583589	-.882637	-1.152985	-1.389643	-1.567066	-1.391876	-1.150086	-.906680	-.672160	-.456081	-.260200
.5	-.398753	-.642988	-.885018	-1.132659	-1.358702	-1.537514	-1.358702	-1.132660	-.885018	-.642988	-.398753
.6	-.260200	-.456082	-.672160	-.906680	-1.150086	-1.391876	-1.567066	-1.389643	-1.152585	-.882637	-.583589
.7	-.164066	-.321777	-.510042	-.728672	-.971984	-1.225960	-1.464879	-1.647513	-1.450325	-1.168629	-.814669
.8	-.104292	-.235697	-.402548	-.605692	-.841786	-1.100953	-1.363502	-1.596272	-1.748507	-1.484895	-1.085778
.9	-.074153	-.190723	-.344703	-.537218	-.766156	-1.023736	-1.293483	-1.546622	-1.727594	-1.801755	-1.384519
1.0	-.065804	-.177968	-.327671	-.516747	-.742808	-.998872	-1.269385	-1.526859	-1.727514	-1.809465	-1.680574

TABLO 3.8 a $\alpha L=3.0$ $\beta L=2.0$

ξ_{yP}

s/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.011022	.008693	.006580	.004789	.003347	.002230	.001391	.000772	.000312	-.000046	-.000356
.1	.008693	.007978	.006916	.005673	.004448	.003345	.002406	.001629	.000989	.000445	-.000046
.2	.006580	.006916	.006947	.006356	.005483	.004454	.003447	.002529	.001715	.000989	.000312
.3	.004789	.005673	.006356	.006691	.006310	.005494	.004505	.003493	.002529	.001629	.000772
.4	.003347	.004448	.005483	.006310	.006670	.006322	.005513	.004505	.003447	.002406	.001391
.5	.002230	.003345	.004454	.005494	.006322	.006680	.006322	.005494	.004454	.003345	.002230
.6	.001391	.002406	.003447	.004505	.005513	.006322	.006670	.006310	.005483	.004448	.003347
.7	.000772	.001629	.002529	.003493	.004505	.005494	.006310	.006691	.006356	.005673	.004789
.8	.000312	.000989	.001715	.002529	.003447	.004454	.005483	.006356	.006947	.006916	.006580
.9	-.000046	.000445	.000989	.001629	.002406	.003345	.004448	.005673	.006916	.007978	.008693
1.0	-.000356	-.000046	.000312	.000772	.001391	.002230	.003347	.004789	.006580	.008693	.011022

$\xi_{\varphi P}$

s/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.022744	-.022479	-.019613	-.016158	-.012733	-.009688	-.007190	-.005295	-.003996	-.003256	-.003022
.1	-.006375	-.008739	-.011958	-.012583	-.011750	-.010237	-.008556	-.007026	-.005838	-.005094	-.004843
.2	.003802	.002441	-.002556	-.007833	-.010018	-.010341	-.009684	-.008652	-.007652	-.006942	-.006684
.3	.009049	.008371	.005647	-.000425	-.006530	-.009351	-.010178	-.009947	-.009214	-.008730	-.008490
.4	.011080	.010843	.009631	.006478	.000060	-.006325	-.009415	-.010501	-.010555	-.010261	-.010087
.5	.011138	.011157	.010906	.009666	.006474	.000000	-.006474	-.009666	-.010906	-.011157	-.011138
.6	.010087	.010261	.010555	.010501	.009415	.006325	-.000060	-.006478	-.009631	-.010843	-.011080
.7	.008490	.008730	.009214	.009947	.010178	.009351	.006530	.000425	-.005647	-.008371	-.009049
.8	.006684	.006942	.007652	.008652	.009684	.010341	.010018	.007833	.002556	-.002441	-.003802
.9	.004843	.005094	.005838	.007026	.008556	.010237	.011750	.012583	.011958	.008739	.006375
1.0	.003022	.003256	.003996	.005295	.007190	.009688	.012733	.016158	.019613	.022479	.022744

ξ_{MP}

s/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.022737	-.032923	-.035169	-.032751	-.027887	-.021995	-.015920	-.010112	-.004779	.000000
.1	.000000	.050025	.016979	-.003603	-.012777	-.016643	-.016463	-.013821	-.009776	-.005019	.000000
.2	.000000	.029346	.072394	.034917	.010810	-.002880	-.009267	-.010700	-.008888	-.005036	.000000
.3	.000000	.015152	.041478	.082825	.042148	.016413	.001673	-.005225	-.006689	-.004508	.000000
.4	.000000	.005666	.019940	.045318	.085953	.044839	.018956	.004353	-.002140	-.002972	.000000
.5	.000000	.000210	.006141	.020272	.045781	.086614	.045781	.020272	.006141	.000210	.000000
.6	.000000	-.002972	-.002140	.004353	.018956	.044839	.085953	.045318	.019940	.005666	.000000
.7	.000000	-.004508	-.006689	-.005225	.001673	.016413	.042148	.082825	.041478	.015152	.000000
.8	.000000	-.005036	-.008888	-.010700	-.009267	-.002880	.010810	.034917	.072394	.029346	.000000
.9	.000000	-.005019	-.009776	-.013821	-.016463	-.016643	-.012777	-.003603	.016979	.050025	.000000
1.0	.000000	-.004779	-.010112	-.015920	-.021995	-.027887	-.032751	-.035169	-.032923	-.022727	.000000

ξ_{VP}

s/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.690571										
	-.309429	-.155665	-.055683	.005342	.039364	.055602	.060859	.059915	.055905	.050643	.044867
.1	.421097	.585943									
		-.414057	-.255561	-.142849	-.065781	-.015277	.016265	.034844	.044915	.049502	.050230
.2	.232461	.360297	.528113								
			-.471887	-.305631	-.183109	-.095861	-.035766	.004271	.029988	.045648	.054015
.3	.106390	.201670	.331265	.503416							
				-.496584	-.324816	-.196469	-.103590	-.038355	.006119	.035329	.053175
.4	.026782	.095052	.191248	.322870	.497628						
					-.502372	-.327747	-.196501	-.100835	-.023058	.013383	.043699
.5	-.019723	.027095	.095635	.192269	.324489	.500000					
						-.500000	-.324489	-.192269	-.095635	-.027095	.019723
.6	-.043699	-.013383	.023058	.100835	.196501	.327747	.502372				
							-.497628	-.322870	-.191248	-.095052	-.026782
.7	-.053175	-.035329	-.006119	.038354	.103590	.196469	.324816	.496584			
								-.503416	-.331265	-.201670	-.106390
.8	-.054015	-.045648	-.029988	-.004271	.035766	.095861	.183109	.305631	.471887		
									-.528113	-.360297	-.232461
.9	-.050230	-.049502	-.044914	-.034844	-.016265	.015277	.065781	.142849	.255561	.414057	
										-.585943	-.421097
1.0	-.044867	-.050643	-.055905	-.059915	-.060859	-.055602	-.039364	-.005342	.055683	.155665	.309429
											-.690571

TABLO 3.8 b $\alpha L=3.0$ $\beta L=2.0$

ξ_{yM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.023744	-.006275	.003802	.009049	.011080	.011139	.010087	.008453	.006664	.004843	.003022
.1	-.022479	-.008740	.002441	.008371	.010842	.011167	.010261	.008730	.006942	.005094	.003256
.2	-.019612	-.011958	-.002556	.006647	.009631	.010906	.010655	.009314	.007652	.005835	.003996
.3	-.016158	-.012593	-.007922	-.000425	.006478	.009666	.010601	.009947	.008652	.007026	.005295
.4	-.012722	-.011750	-.010018	-.006520	.000060	.006474	.009415	.010178	.009654	.008555	.007190
.5	-.009588	-.010237	-.010341	-.009351	-.006335	.000000	.006335	.009351	.010341	.010237	.009588
.6	-.007190	-.008555	-.009654	-.010178	-.009415	-.006474	-.000060	.006520	.010018	.011750	.012722
.7	-.005295	-.007026	-.008652	-.009947	-.010601	-.009666	-.006478	.000425	.007922	.012593	.016158
.8	-.003996	-.005835	-.007652	-.009314	-.010655	-.010906	-.009631	-.006647	.002556	.011958	.019612
.9	-.003256	-.005094	-.006942	-.008730	-.010261	-.011167	-.010842	-.008371	-.002441	.008739	.022479
1.0	-.003022	-.004843	-.006664	-.008453	-.010087	-.011139	-.011080	-.009049	-.003802	.006275	.023744

$\xi_{\varphi M}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.218670	.123472	.073931	.033952	.008720	-.006125	-.013974	-.017426	-.018411	-.018323	-.018133
.1	.123472	.145402	.082121	.039446	.012153	-.004148	-.012975	-.017045	-.018285	-.018455	-.018323
.2	.073931	.082121	.109407	.058016	.024163	.003134	-.008943	-.015113	-.017692	-.018285	-.018411
.3	.033952	.039446	.058016	.093274	.047817	.018207	.000083	-.010101	-.015113	-.017045	-.017426
.4	.008720	.012153	.024163	.047817	.086908	.044269	.016705	.000083	-.008943	-.012975	-.013974
.5	-.006125	-.004148	.003134	.018207	.044269	.085285	.044269	.018207	.003134	-.004148	-.006125
.6	-.013974	-.012975	-.008943	.000083	.016705	.044269	.086908	.047817	.024163	.012153	.008720
.7	-.017426	-.017045	-.015113	-.010101	.000083	.018207	.047817	.093274	.058016	.039446	.033952
.8	-.018411	-.018285	-.017692	-.015113	-.008943	.003134	.024163	.058016	.109407	.082121	.073931
.9	-.018323	-.018455	-.018285	-.017045	-.012975	-.004148	.012153	.039446	.082121	.145402	.123472
1.0	-.018133	-.018323	-.018411	-.017426	-.013974	-.006125	.008720	.033952	.073931	.123472	.218670

ξ_{MM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000 1.000000	.714135	.489409	.317715	.194030	.108515	.052770	.019459	.002550	-.002715	.000000
.1	.000000	-.245008 .754992	.520442	.341794	.211390	.120479	.060574	.024177	.005059	-.001725	.000000
.2	.000000	-.171645	-.280732 .619268	.417683	.267246	.159790	.086805	.040437	.013961	.001911	.000000
.3	.000000	-.114848	-.262558	-.449718 .550282	.357398	.232077	.136201	.071970	.031743	.009418	.000000
.4	.000000	-.072683	-.172615	-.306778	-.482569 .517431	.343476	.214699	.123311	.061527	.022362	.000000
.5	.000000	-.042689	-.107067	-.199712	-.328147	-.500000 .500000	.328147	.199712	.107067	.042690	.000000
.6	.000000	-.022362	-.061527	-.123311	-.214699	-.343476	-.517432 .482568	.306778	.172615	.072683	.000000
.7	.000000	-.009417	-.031744	-.071970	-.136201	-.232077	-.357398	-.550282 .449719	.262557	.114849	.000000
.8	.000000	-.001912	-.013961	-.040428	-.086805	-.159790	-.267246	-.417683	-.619268 .380732	.171645	.000000
.9	.000000	.001725	-.005059	-.024177	-.060574	-.120479	-.211390	-.341794	-.520442	-.754992 .245008	.000000
1.0	.000000	.002715	-.002550	-.019460	-.052770	-.108515	-.194030	-.317716	-.489409	-.714135	-1.000000 .000000

ξ_{VM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-3.162793	-2.553234	-1.970281	-1.457298	-1.031340	-.693057	-.434115	-.242143	-.103928	-.007441	.057092
.1	-2.258821	-2.642589	-2.055105	-1.530938	-1.091890	-.740607	-.470030	-.268305	-.132276	-.019743	.049300
.2	-1.544589	-1.895436	-2.294765	-1.747509	-1.275125	-.888337	-.584525	-.354054	-.184557	-.063547	.019818
.3	-1.003758	-1.302324	-1.663146	-2.090454	-1.578347	-1.141674	-.787480	-.511433	-.303446	-.151379	-.043407
.4	-.610654	-.852258	-1.158081	-1.537764	-1.988847	-1.501260	-1.087490	-.753370	-.494007	-.298996	-.155822
.5	-.337017	-.525435	-.773159	-1.092409	-1.489239	-1.958699	-1.489238	-1.092408	-.773159	-.525434	-.337016
.6	-.155822	-.298997	-.494007	-.753370	-1.087490	-1.501260	-1.988847	-1.537764	-1.158082	-.852258	-.610654
.7	-.043407	-.151379	-.303446	-.511434	-.787480	-1.141674	-1.578347	-2.090454	-1.663147	-1.302324	-1.003757
.8	.019818	-.063546	-.184556	-.354053	-.584524	-.888336	-1.275125	-1.747509	-2.294765	-1.895436	-1.544589
.9	.049301	-.019742	-.132275	-.268303	-.470030	-.740606	-1.091890	-1.530937	-2.055105	-2.642589	-2.258821
1.0	.057093	-.007442	-.103929	-.242143	-.434114	-.693057	-1.031340	-1.457297	-1.970281	-2.553234	-3.162793

TABLO 3.9 a $\alpha L=3.0$ $\beta L=2.5$

ξ_{yP}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.011323	.008522	.006026	.003979	.002407	.001267	.000484	-.000030	-.000362	-.000586	-.000763
.1	.008522	.007522	.006239	.004833	.003520	.002399	.001497	.000795	.000250	-.000192	-.000586
.2	.006026	.006239	.006164	.005531	.004568	.003524	.002536	.001663	.000911	.000250	-.000362
.3	.003979	.004833	.005531	.005807	.005408	.004581	.003595	.002600	.001663	.000795	-.000030
.4	.002407	.003520	.004568	.005408	.005775	.005424	.004608	.003595	.002536	.001497	.000484
.5	.001267	.002399	.003524	.004581	.005424	.005788	.005424	.004581	.003524	.002399	.001267
.6	.000484	.001497	.002536	.003595	.004608	.005424	.005775	.005408	.004568	.003520	.002407
.7	-.000030	.000795	.001663	.002600	.003595	.004581	.005408	.005807	.005531	.004833	.003979
.8	-.000362	.000250	.000911	.001663	.002536	.003524	.004568	.005531	.006164	.006239	.006026
.9	-.000586	-.000192	.000250	.000795	.001497	.002399	.003520	.004833	.006239	.007522	.008522
1.0	-.000763	-.000586	-.000362	-.000030	.000484	.001267	.002407	.003979	.006026	.008522	.011323

$\xi_{\varphi P}$

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.028640	-.026854	-.022838	-.018067	-.013448	-.009469	-.006342	-.004097	-.002564	-.001917	-.001705
.1	-.009218	-.011325	-.013955	-.013837	-.012260	-.010111	-.007962	-.006151	-.004845	-.004094	-.003863
.2	.002529	.001280	-.003501	-.008503	-.010347	-.010315	-.009349	-.008104	-.007002	-.006283	-.006043
.3	.008727	.008100	.005436	-.000614	-.006686	-.009403	-.010081	-.009713	-.009002	-.008407	-.008182
.4	.011197	.010969	.009769	.006686	.000077	-.006399	-.009487	-.010528	-.010539	-.010236	-.010073
.5	.011304	.011329	.011074	.009833	.006591	.000000	-.006591	-.009833	-.011074	-.011329	-.011304
.6	.010072	.010236	.010539	.010528	.009487	.006399	-.000077	-.006686	-.009769	-.010969	-.011197
.7	.008182	.008407	.009002	.009713	.010081	.009403	.006686	.000614	-.005436	-.008100	-.008727
.8	.006043	.006283	.007002	.008104	.009349	.010315	.010347	.008503	.003501	-.001280	-.002529
.9	.003863	.004094	.004845	.006151	.007962	.010111	.012260	.013837	.013955	.011325	.009218
1.0	.001705	.001917	.002564	.004097	.006342	.009469	.013448	.018067	.022838	.026854	.028640

ξ_{MP}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.032033	-.045965	-.048066	-.043534	-.035700	-.026809	-.018215	-.010663	-.004536	.000000
.1	.000000	.045463	.010046	-.010260	-.019823	-.022221	-.020198	-.015754	-.010291	-.004793	.000000
.2	.000000	.027477	.070995	.031797	.007217	-.006305	-.011931	-.012268	-.009372	-.004849	.000000
.3	.000000	.014496	.041054	.082722	.041468	.015057	.000152	-.006348	-.007111	-.004368	.000000
.4	.000000	.005718	.019962	.045945	.087009	.045204	.018655	.003829	-.002426	-.002885	.000000
.5	.000000	.000220	.006057	.020449	.046625	.087979	.046625	.020449	.006057	.000220	.000000
.6	.000000	-.002885	-.002426	.003829	.018655	.045204	.087009	.045945	.019962	.005718	.000000
.7	.000000	-.004368	-.007111	-.006348	.000152	.015057	.041468	.082722	.041054	.014496	.000000
.8	.000000	-.004849	-.009372	-.012268	-.011931	-.006305	.007217	.031797	.070995	.027477	.000000
.9	.000000	-.004793	-.010291	-.015754	-.020198	-.022221	-.019823	-.010260	.010046	.045463	.000000
1.0	.000000	-.004536	-.010663	-.018215	-.026809	-.035700	-.043534	-.048066	-.045965	-.032033	.000000

ξ_{VP}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.562479										
	-.437521	-.215937	-.070652	.016512	.066456	.086528	.089089	.081595	.068359	.052580	.036679
.1	.355471	.554144									
		-.445856	-.270752	-.142694	-.054548	.002039	.035114	.051460	.056179	.052573	.049308
.2	.201592	.351315	.522756								
			-.477244	-.312753	-.154929	-.090916	-.025945	.015602	.039461	.048552	.046192
.3	.094241	.200316	.335999	.502287							
				-.497713	-.322736	-.201116	-.102184	-.032250	.013276	.038478	.046092
.4	.024492	.094699	.195578	.329706	.496796						
					-.503204	-.336105	-.201873	-.100564	-.029210	.015965	.038080
.5	-.015946	.025650	.095930	.197295	.332097	.500000					
						-.500000	-.332097	-.197295	-.095979	-.025651	.015946
.6	-.038081	-.015965	.029211	.100564	.201873	.336105	.503205				
							-.496796	-.329706	-.195578	-.094699	-.024492
.7	-.046092	-.038478	-.013276	.032250	.102184	.201116	.322736	.497713			
								-.502288	-.335998	-.200318	-.094241
.8	-.046192	-.048664	-.039461	-.015803	.025945	.090916	.154929	.312766	.477244		
									-.522756	-.351315	-.201592
.9	-.049308	-.052574	-.056179	-.051460	-.035114	-.002039	.054548	.142694	.270752	.445856	
										-.554144	-.355470
1.0	-.036679	-.052580	-.068359	-.081595	-.089089	-.086527	-.066456	-.016512	.070652	.215937	.437521
											-.562479

TABLO 3.9 b

$\alpha L=3.0 \quad \beta L=2.5$

ξ_{yM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.029640	-.009218	.002529	.008737	.011197	.011304	.010073	.008152	.006043	.003863	.001705
.1	-.026854	-.011225	.001280	.008100	.010969	.011329	.010236	.008407	.006283	.004094	.001917
.2	-.022628	-.013955	-.003501	.005436	.009769	.011074	.010539	.009002	.007002	.004845	.002664
.3	-.018057	-.013537	-.008503	-.000614	.006586	.009833	.010528	.009713	.008104	.006151	.004097
.4	-.013448	-.012260	-.010347	-.006686	.000077	.006591	.009487	.010081	.009349	.007962	.006342
.5	-.009469	-.010111	-.010315	-.009403	-.006399	.000000	.006399	.009403	.010315	.010111	.009469
.6	-.006342	-.007962	-.009349	-.010081	-.009487	-.006591	-.000077	.006686	.010347	.012260	.013448
.7	-.004097	-.006151	-.008104	-.009713	-.010528	-.009833	-.006586	.000614	.008503	.013537	.018057
.8	-.002664	-.004845	-.007002	-.009002	-.010539	-.011074	-.009769	-.005436	.003501	.013955	.022628
.9	-.001917	-.004094	-.006283	-.008407	-.010236	-.011329	-.010969	-.008100	-.001280	.011225	.026854
1.0	-.001705	-.003863	-.006043	-.008152	-.010073	-.011304	-.011197	-.008737	-.002529	.009218	.029640

$\xi_{\varphi M}$

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.240296	.152058	.086466	.040677	.010844	-.007010	-.016498	-.020642	-.021803	-.021708	-.021507
.1	.152058	.151979	.093761	.045709	.014071	-.005127	-.015552	-.020297	-.021802	-.021868	-.021708
.2	.086466	.093761	.118570	.063404	.025689	.002174	-.011484	-.018364	-.021130	-.021802	-.021803
.3	.040677	.045709	.063404	.097351	.049590	.017684	-.002047	-.013072	-.018364	-.020297	-.020642
.4	.010844	.014071	.025689	.049590	.088474	.044563	.015549	-.002047	-.011484	-.015552	-.016498
.5	-.007010	-.005127	.002174	.017684	.044563	.086140	.044563	.017684	.002174	-.005127	-.007010
.6	-.016498	-.015552	-.011484	-.002047	.015549	.044563	.088474	.049590	.025689	.014071	.010844
.7	-.020642	-.020297	-.018364	-.013072	-.002047	.017684	.049590	.097351	.063404	.045709	.040677
.8	-.021803	-.021802	-.021130	-.018364	-.011484	.002174	.025689	.063404	.118570	.093761	.086466
.9	-.021708	-.021867	-.021802	-.020297	-.015552	-.005127	.014071	.045709	.093761	.151979	.152058
1.0	-.021507	-.021708	-.021803	-.020642	-.016498	-.007010	.010844	.040677	.086466	.152058	.240296

ξ_{MM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000 / 1.000000	.755828	.550967	.371376	.231993	.131122	.062673	.023139	.002954	-.002955	.000000
.1	.000000	-.206750 / .793250	.575674	.391777	.247688	.142429	.071228	.027736	.005362	-.002045	.000000
.2	.000000	-.153714	-.348222 / .651778	.457183	.299658	.180930	.097716	.044332	.014340	.001472	.000000
.3	.000000	-.107295	-.252635	-.431308 / .568692	.392247	.252096	.148355	.077116	.032650	.008918	.000000
.4	.000000	-.059831	-.172026	-.307564	-.475117 / .524883	.358637	.227316	.130076	.063320	.021779	.000000
.5	.000000	-.041614	-.109067	-.206431	-.336765	-.500000 / .500000	.336765	.206431	.109067	.041614	.000000
.6	.000000	-.021779	-.063320	-.130076	-.227316	-.358637	-.524883 / .475117	.307564	.172026	.059831	.000000
.7	.000000	-.008917	-.032650	-.077116	-.148355	-.252096	-.392247	-.568692 / .431308	.252635	.107295	.000000
.8	.000000	-.001471	-.014340	-.044332	-.097716	-.180930	-.299658	-.457182	-.651778 / .348222	.153714	.000000
.9	.000000	.002046	-.005362	-.027736	-.071228	-.142429	-.247688	-.391777	-.575674	-.793250 / .206750	.000000
1.0	.000000	.002957	-.002954	-.023139	-.062672	-.131122	-.231993	-.371376	-.550967	-.765828	-1.000000 / .000000

ξ_{VM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-2.345008	-2.283714	-1.989028	-1.596319	-1.194679	-.831393	-.528801	-.292939	-.120915	-.006274	.057222
.1	-1.796756	-2.297164	-2.025579	-1.642912	-1.241043	-.872459	-.562361	-.318573	-.139184	-.018146	.050824
.2	-1.292250	-1.761700	-2.105921	-1.769222	-1.378919	-1.001544	-.672479	-.406091	-.204250	-.062661	.024653
.3	-.869888	-1.269518	-1.630041	-1.929335	-1.587967	-1.215399	-.866309	-.568182	-.330882	-.154122	-.032995
.4	-.540584	-.857880	-1.188035	-1.521042	-1.819282	-1.491731	-1.139596	-.811882	-.522234	-.307782	-.136073
.5	-.300110	-.530498	-.817571	-1.135147	-1.471922	-1.783057	-1.471922	-1.135147	-.817571	-.530492	-.300110
.6	-.136073	-.307784	-.522234	-.811884	-1.139595	-1.491731	-1.819283	-1.521042	-1.188035	-.857879	-.540584
.7	-.032995	-.154122	-.330882	-.568182	-.866309	-1.215400	-1.587967	-1.929335	-1.630041	-1.269519	-.869888
.8	.024653	-.062662	-.204251	-.406090	-.672479	-1.001544	-1.378920	-1.769222	-2.105921	-1.761699	-1.292250
.9	.050824	-.018149	-.139185	-.318574	-.562362	-.872459	-1.241042	-1.642912	-2.025579	-2.297163	-1.796755
1.0	.057221	-.006274	-.120915	-.292940	-.528801	-.831392	-1.194680	-1.596319	-1.989029	-2.283714	-2.345009

TABLO 3.10 a $\alpha L=3.5$ $\beta L=2.0$

ξ_{yP}

a/l x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.007046	.005452	.004024	.002868	.001960	.001285	.000800	.000450	.000223	.000050	-.000092
.1	.005452	.005120	.004452	.003612	.002782	.002052	.001452	.000977	.000607	.000310	.000050
.2	.004024	.004452	.004604	.004239	.003575	.002837	.002142	.001540	.001025	.000607	.000223
.3	.002868	.003612	.004239	.004521	.004232	.003606	.002880	.002175	.001540	.000977	.000450
.4	.001960	.002782	.003575	.004232	.004533	.004251	.003622	.002880	.002142	.001452	.000800
.5	.001285	.002052	.002837	.003606	.004251	.004543	.004251	.003606	.002837	.002052	.001285
.6	.000800	.001452	.002142	.002880	.003622	.004251	.004533	.004232	.003575	.002782	.001960
.7	.000450	.000977	.001540	.002175	.002880	.003606	.004232	.004521	.004239	.003612	.002868
.8	.000223	.000607	.001025	.001540	.002142	.002837	.003575	.004239	.004604	.004452	.004024
.9	.000050	.000310	.000607	.000977	.001452	.002052	.002782	.003612	.004452	.005120	.005452
1.0	-.000092	.000050	.000223	.000450	.000800	.001285	.001960	.002868	.004024	.005452	.007046

$\xi_{\varphi P}$

a/l x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.016314	-.015261	-.012576	-.010346	-.007853	-.005729	-.004050	-.002616	-.001989	-.001532	-.001374
.1	-.002586	-.004666	-.007348	-.008561	-.007897	-.006669	-.005349	-.004177	-.003291	-.002723	-.002533
.2	.004545	.003391	-.001041	-.005636	-.007273	-.007287	-.006523	-.005524	-.004615	-.003991	-.003764
.3	.007580	.007119	.005345	-.000028	-.005086	-.007044	-.007291	-.006735	-.005961	-.005224	-.005089
.4	.008222	.008168	.007506	.005284	.000085	-.005064	-.007132	-.007520	-.007161	-.006668	-.006440
.5	.007520	.007762	.007879	.007327	.005181	.000000	-.005181	-.007327	-.007879	-.007762	-.007520
.6	.006440	.006668	.007161	.007520	.007132	.005064	-.000085	-.005284	-.007506	-.008168	-.008222
.7	.005089	.005224	.005961	.006735	.007291	.007044	.005086	.000028	-.005345	-.007119	-.007580
.8	.003764	.003991	.004615	.005524	.006523	.007287	.007278	.005636	.001041	-.003391	-.004545
.9	.002533	.002723	.003291	.004177	.005349	.006669	.007897	.008561	.007348	.004666	.002586
1.0	.001374	.001532	.001989	.002616	.004050	.005729	.007853	.010346	.012576	.015261	.016314

ξ_{MP}

a/l x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.018595	-.025664	-.026159	-.023316	-.019063	-.014517	-.010226	-.006391	-.003014	.000000
.1	.000000	.048546	.016060	-.001857	-.010412	-.013237	-.012753	-.010488	-.007237	-.003772	.000000
.2	.000000	.025259	.066606	.028521	.006490	-.004901	-.009507	-.009947	-.007908	-.004403	.000000
.3	.000000	.010775	.032997	.072012	.032266	.009175	-.002747	-.007414	-.007483	-.004665	.000000
.4	.000000	.002329	.012491	.034294	.073065	.033289	.010387	-.001105	-.005070	-.004137	.000000
.5	.000000	-.002146	.000847	.011574	.033865	.072135	.033865	.011574	.000847	-.002146	.000000
.6	.000000	-.004137	-.005070	-.001105	.010387	.033289	.073065	.034294	.012491	.002329	.000000
.7	.000000	-.004665	-.007483	-.007414	-.002747	.009175	.032266	.072012	.032997	.010775	.000000
.8	.000000	-.004403	-.007907	-.009947	-.009507	-.004901	.006490	.028521	.066606	.025259	.000000
.9	.000000	-.003772	-.007237	-.010488	-.012753	-.013237	-.010412	-.001857	.016060	.048546	.000000
1.0	.000000	-.003014	-.006392	-.010226	-.014517	-.019063	-.023316	-.026160	-.025664	-.018595	.000000

ξ_{VP}

a/l x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.734287										
	-.265713	-.118293	-.031252	.015694	.027969	.045289	.044750	.040757	.035954	.031761	.028734
.1	.402559	.580251									
		-.419749	-.241837	-.125118	-.051970	-.008512	.015688	.028159	.034097	.036561	.035454
.2	.191315	.322552	.516322								
			-.483678	-.290101	-.159495	-.074698	-.021739	.010171	.028972	.040202	.047384
.3	.064233	.157495	.295811	.496459							
				-.503541	-.302579	-.167338	-.077575	-.020135	.015952	.039716	.052590
.4	-.006422	.057258	.152255	.293477	.495120						
					-.504880	-.302814	-.164286	-.071959	-.011661	.027552	.053462
.5	-.040919	.000766	.063361	.157504	.297283	.500000					
						-.500000	-.297283	-.157503	-.063351	-.000766	.040919
.6	-.053462	-.027552	.011661	.071969	.164286	.302814	.504880				
							-.495120	-.293477	-.152255	-.057257	.006422
.7	-.052590	-.039715	-.015952	.020135	.077576	.167338	.302579	.503541			
								-.496459	-.295811	-.157495	-.064232
.8	-.047384	-.040202	-.028973	-.010171	.021739	.074698	.159495	.290101	.483678		
									-.516322	-.322552	-.191315
.9	-.035454	-.036561	-.034097	-.028158	-.015667	.008512	.051970	.125119	.241837	.419749	
										-.580251	-.402559
1.0	-.028734	-.031760	-.035953	-.040757	-.044750	-.045289	-.037969	-.015694	.031252	.118293	.265714
											-.734286

TABLO 3.10 b $\alpha L=3.5$ $\beta L=2.0$

ξ_{yM}

y/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.010314	-.002586	.004545	.007580	.008222	.007630	.006440	.005089	.003764	.002533	.001374
.1	-.015261	-.004666	.003391	.007119	.008168	.007762	.006668	.005334	.003991	.002722	.001522
.2	-.012976	-.007943	-.001041	.005046	.007506	.007879	.007161	.005961	.004615	.003281	.001589
.3	-.010346	-.008561	-.006636	-.000028	.005284	.007337	.007520	.005725	.005524	.004177	.002316
.4	-.007553	-.007837	-.007278	-.005056	.000085	.005181	.007133	.007251	.006523	.005349	.004050
.5	-.005728	-.006659	-.007287	-.007044	-.005064	.000000	.005064	.007044	.007287	.006659	.005728
.6	-.004050	-.005349	-.006523	-.007251	-.007133	-.005181	-.000085	.005056	.007278	.007837	.007553
.7	-.002316	-.004177	-.005524	-.005725	-.007520	-.007337	-.005284	.000028	.006636	.008561	.010346
.8	-.001589	-.003281	-.004615	-.005961	-.007161	-.007879	-.007506	-.005046	.001041	.007943	.012976
.9	-.001522	-.002722	-.003991	-.005334	-.006668	-.007762	-.008168	-.007119	-.003391	.004666	.015261
1.0	-.001374	-.002533	-.003764	-.005089	-.006440	-.007630	-.008222	-.007580	-.004545	.002586	.010314

$\xi_{\varphi M}$

y/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.180992	.099351	.047394	.016136	-.001264	-.009833	-.013127	-.013579	-.012806	-.011865	-.011441
.1	.099351	.112344	.056223	.021388	.001608	-.008474	-.012676	-.013632	-.013109	-.012268	-.011865
.2	.047394	.056223	.085825	.039636	.012113	-.003018	-.010348	-.013116	-.013541	-.013109	-.012806
.3	.016136	.021388	.039636	.075831	.034038	.009314	-.004166	-.010545	-.013116	-.013632	-.013579
.4	-.001264	.001608	.012113	.034038	.072707	.032505	.008755	-.004166	-.010348	-.012676	-.013127
.5	-.009833	-.008474	-.003018	.009314	.032505	.072055	.032505	.009314	-.003018	-.008474	-.009833
.6	-.013127	-.012676	-.010348	-.004166	.008755	.032505	.072707	.034038	.012113	.001608	-.001264
.7	-.013579	-.013632	-.013116	-.010545	-.004166	.009314	.034038	.075831	.039636	.021388	.016136
.8	-.012806	-.013109	-.013541	-.013116	-.010348	-.003018	.012113	.039636	.085825	.056223	.047394
.9	-.011865	-.012268	-.013109	-.013632	-.012676	-.008474	.001608	.021388	.056223	.112344	.099351
1.0	-.011442	-.011865	-.012806	-.013579	-.013127	-.009833	-.001264	.016136	.047394	.099351	.180992

ξ_{MM}

y/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000 1.000000	.651228	.403021	.232502	.122816	.054428	.015444	-.003760	-.009963	-.007734	.000000
.1	.000000	-.287981 .712019	.446007	.262589	.141787	.066154	.022220	-.000195	-.008354	-.007329	.000000
.2	.000000	-.183026	-.418837 .581163	.355562	.204330	.105895	.046043	.012951	-.002025	-.004952	.000000
.3	.000000	-.110655	-.262493	-.472746 .527254	.321399	.182738	.093578	.040645	.012150	.000448	.000000
.4	.000000	-.061637	-.154663	-.292663	-.492577 .507423	.308962	.175366	.089810	.028596	.011213	.000000
.5	.000000	-.030232	-.083414	-.169822	-.303117	-.500000 .500000	.303117	.169822	.083414	.030232	.000000
.6	.000000	-.011213	-.028596	-.089810	-.175366	-.308962	-.507423 .492577	.292663	.154663	.061597	.000000
.7	.000000	-.000448	-.012150	-.040645	-.093879	-.182738	-.321399	-.527255 .472745	.262493	.110655	.000000
.8	.000000	.004952	.002026	-.012951	-.046044	-.105895	-.204330	-.355562	-.581162 .418837	.183026	.000000
.9	.000000	.007329	.008353	.000195	-.022221	-.066155	-.141787	-.262589	-.446007	-.712019 .287981	.000000
1.0	.000000	.007733	.009963	.003760	-.015445	-.054429	-.122816	-.232502	-.403021	-.651227	-1.000000 .000000

ξ_{VM}

y/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-4.063204	-2.947901	-2.053185	-1.370490	-.870807	-.518239	-.277532	-.117774	-.013904	.053607	.098102
.1	-2.646839	-3.146258	-2.310768	-1.489617	-.957061	-.578171	-.317295	-.142940	-.028569	.045094	.095210
.2	-1.638534	-2.062403	-2.676181	-1.850895	-1.225009	-.768893	-.447767	-.228249	-.081514	.015517	.080019
.3	-.949124	-1.286568	-1.779103	-2.459188	-1.691170	-1.111173	-.689648	-.393104	-.189941	-.053236	.038134
.4	-.497511	-.753335	-1.129197	-1.659016	-2.371547	-1.629874	-1.070807	-.663748	-.377596	-.182236	-.050706
.5	-.215853	-.402246	-.677717	-1.073130	-1.620735	-2.348639	-1.620736	-1.073131	-.677717	-.402247	-.215854
.6	-.050707	-.182237	-.377597	-.663749	-1.070807	-1.629874	-2.371547	-1.659016	-1.129196	-.753335	-.497511
.7	.038164	-.053238	-.189940	-.393103	-.689647	-1.111173	-1.691171	-2.459188	-1.779103	-1.286563	-.949125
.8	.080018	.015518	-.081514	-.228248	-.447766	-.768892	-1.225009	-1.850895	-2.676181	-2.062403	-1.638534
.9	.095209	.045094	-.028568	-.142939	-.317294	-.578169	-.957061	-1.489616	-2.310767	-3.146259	-2.646839
1.0	.098101	.053605	-.013904	-.117774	-.277531	-.518238	-.870806	-1.370489	-2.053184	-2.947900	-4.063204

TABLO 3.11 a $\alpha L=3.5$ $\beta L=3.0$

ξ_{yP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.007227	.005100	.003279	.001882	.000907	.000285	-.000070	-.000242	-.000303	-.000306	-.000286
.1	.005100	.004493	.003597	.002619	.001744	.001050	.000544	.000200	-.000027	-.000182	-.000306
.2	.003279	.003597	.003668	.003243	.002553	.001832	.001197	.000685	.000288	-.000027	-.000303
.3	.001882	.002619	.003243	.003523	.003228	.002606	.001905	.001250	.000685	.000200	-.000242
.4	.000907	.001744	.002553	.003228	.003540	.003259	.002632	.001905	.001197	.000544	-.000070
.5	.000285	.001050	.001832	.002606	.003259	.003556	.003259	.002606	.001832	.001050	.000285
.6	-.000070	.000544	.001197	.001905	.002632	.003259	.003540	.003228	.002553	.001744	.000907
.7	-.000242	.000200	.000685	.001250	.001905	.002606	.003228	.003523	.003243	.002619	.001882
.8	-.000303	-.000027	.000288	.000685	.001197	.001832	.002553	.003243	.003668	.003597	.003279
.9	-.000306	-.000182	-.000027	.000200	.000544	.001050	.001744	.002619	.003597	.004493	.005100
1.0	-.000286	-.000306	-.000303	-.000242	-.000070	.000285	.000907	.001882	.003279	.005100	.007227

$\xi_{\varphi P}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.021920	-.020082	-.016155	-.011783	-.007850	-.004736	-.002506	-.001053	-.000243	.000132	.000224
.1	-.005502	-.007445	-.009791	-.009472	-.007907	-.005975	-.004184	-.002779	-.001836	-.001333	-.001190
.2	.002507	.002475	-.001755	-.006053	-.007331	-.006959	-.005750	-.004501	-.003495	-.002888	-.002699
.3	.007491	.007067	.005029	-.000087	-.005123	-.006916	-.006905	-.006114	-.005208	-.004555	-.004348
.4	.008383	.008325	.007664	.005442	.000141	-.005075	-.007064	-.007293	-.006808	-.006273	-.006068
.5	.007596	.007730	.007883	.007410	.005272	.000000	-.005272	-.007410	-.007883	-.007730	-.007596
.6	.006068	.006273	.006808	.007293	.007064	.005075	-.000141	-.005442	-.007664	-.008325	-.008383
.7	.004348	.004555	.005208	.006114	.006905	.006916	.005123	.000087	-.005029	-.007067	-.007491
.8	.002699	.002888	.003495	.004501	.005750	.006958	.007331	.006053	.001755	-.002475	-.002507
.9	.001190	.001333	.001836	.002779	.004184	.005975	.007907	.009472	.009791	.007445	.005503
1.0	-.000224	-.000132	.000243	.001063	.002506	.004736	.007850	.011783	.016155	.020082	.021920

ξ_{MP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.022340	-.042521	-.042497	-.035542	-.026658	-.018120	-.011015	-.005687	-.002085	.000000
.1	.000000	.042693	.007339	-.011222	-.016505	-.019205	-.016223	-.011759	-.007133	-.003059	.000000
.2	.000000	.023353	.064474	.025165	.002127	-.009190	-.012756	-.011672	-.008197	-.002916	.000000
.3	.000000	.010227	.033974	.072473	.031377	.006869	-.005389	-.009331	-.008171	-.004403	.000000
.4	.000000	.002152	.012355	.034909	.074266	.033218	.009011	-.002692	-.005914	-.004067	.000000
.5	.000000	-.002205	.000216	.010970	.034229	.074291	.034229	.010970	.000216	-.002205	.000000
.6	.000000	-.004067	-.005914	-.002692	.009011	.033218	.074266	.034909	.012355	.002152	.000000
.7	.000000	-.004404	-.008171	-.009331	-.005389	.006869	.031377	.072473	.033974	.010227	.000000
.8	.000000	-.002916	-.008197	-.011672	-.012756	-.009190	.002127	.025165	.064474	.023353	.000000
.9	.000000	-.003059	-.007133	-.011759	-.016223	-.019205	-.016505	-.011222	.007339	.042693	.000000
1.0	.000000	-.002085	-.005687	-.011015	-.018120	-.026658	-.035542	-.042497	-.042521	-.022340	.000000

ξ_{VP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.534005 -.465995	-.200240	-.029185	.048292	.084239	.089744	.079277	.062316	.044264	.028042	.014043
.1	.312056	.541879 -.458121	-.259515	-.121297	-.022544	.016250	.039920	.047054	.044470	.036293	.024297
.2	.154837	.317175	.510278 -.489722	-.303955	-.164515	-.068455	-.007985	.025919	.040988	.042717	.033955
.3	.052319	.157879	.304241	.492164 -.507836	-.220790	-.176754	-.074995	-.009200	.028273	.042545	.041397
.4	-.005339	.054914	.150241	.302276	.491529 -.508471	-.319097	-.172408	-.068402	-.001719	.033955	.043217
.5	-.033917	-.004705	.059310	.162762	.309874	.500000 -.500000	-.309874	-.162762	-.059310	.004705	.033917
.6	-.043217	-.033955	.001719	.068403	.172408	.319097	.508471 -.491529	-.302276	-.150241	-.054915	.005339
.7	-.041397	-.042544	-.028273	.009200	.074995	.176754	.220790	.507836 -.492164	-.304241	-.157879	-.052319
.8	-.033955	-.042717	-.040989	-.025919	.007985	.068455	.164516	.303955	.489722 -.510278	-.317175	-.154837
.9	-.024296	-.036293	-.044470	-.047053	-.039920	-.016250	.022544	.121298	.259515	.458121 -.541879	-.312056
1.0	-.014043	-.028041	-.044265	-.062316	-.079277	-.089744	-.084238	-.048292	.029185	.200240	.465995 -.534005

TABLO 3.11 b $\alpha L=3.5$ $\beta L=3.0$

ξ_{yM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.021920	-.005502	.003507	.007491	.008292	.007596	.006068	.004248	.002690	.001190	-.000224
.1	-.020052	-.007445	.002475	.007057	.008225	.007730	.006279	.004566	.002858	.001323	-.000132
.2	-.016155	-.009781	-.001755	.005029	.007664	.007653	.006808	.005208	.003495	.001836	.000243
.3	-.011752	-.009472	-.006082	-.000097	.005442	.007410	.007293	.006114	.004501	.002779	.001053
.4	-.007550	-.007907	-.007321	-.005123	.000141	.005272	.007054	.006905	.005750	.004184	.002506
.5	-.004735	-.005975	-.006958	-.006916	-.005075	.000000	.005075	.006916	.006958	.005975	.004735
.6	-.002506	-.004184	-.005750	-.006905	-.007054	-.005272	-.000141	.005123	.007321	.007907	.007550
.7	-.001053	-.002779	-.004501	-.006114	-.007293	-.007410	-.005442	.000097	.006082	.009472	.011752
.8	-.000243	-.001836	-.003495	-.005208	-.006808	-.007653	-.007664	-.005029	.001755	.009781	.016155
.9	.000132	-.001323	-.002858	-.004566	-.006279	-.007730	-.008225	-.007057	-.002475	.007445	.020052
1.0	.000224	-.001190	-.002690	-.004248	-.006068	-.007596	-.008292	-.007491	-.003507	.005502	.021920

$\xi_{\varphi M}$

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.209847	.122683	.061220	.021586	-.001411	-.012777	-.016880	-.017091	-.015787	-.014482	-.012974
.1	.122683	.123553	.068826	.026348	.001276	-.011522	-.016529	-.017249	-.016188	-.014974	-.014482
.2	.061220	.068826	.095264	.042992	.011904	-.005964	-.014310	-.017015	-.016984	-.016188	-.015787
.3	.021586	.026348	.042992	.079200	.034625	.007197	-.007825	-.014727	-.017015	-.017249	-.017091
.4	-.001411	.001276	.011904	.034625	.073752	.031922	.006223	-.007825	-.014310	-.016529	-.016880
.5	-.012777	-.011522	-.005964	.007197	.031922	.072581	.031922	.007197	-.005964	-.011522	-.012777
.6	-.016880	-.016529	-.014310	-.007825	.006223	.031922	.073752	.034625	.011904	.001276	-.001411
.7	-.017091	-.017249	-.017015	-.014727	-.007825	.007197	.034625	.079200	.042992	.026348	.021586
.8	-.015787	-.016188	-.016984	-.017015	-.014310	-.005964	.011904	.042992	.095264	.068826	.061220
.9	-.014482	-.014974	-.016188	-.017249	-.016529	-.011522	.001276	.026348	.068826	.123553	.122683
1.0	-.012974	-.014482	-.015787	-.017091	-.016880	-.012777	-.001411	.021586	.061220	.122683	.209847

ξ_{MM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000 1.000000	.729040	.498609	.304801	.163766	.070567	.016812	-.008561	-.014929	-.009864	-.000001
.1	.000000	-.226958 .772042	.529097	.328966	.181171	.082322	.023634	-.005095	-.013409	-.009440	.000000
.2	.000000	-.160752	-.375806 .624194	.408818	.241443	.122816	.049593	.009339	-.006702	-.007294	.000000
.3	.000000	-.103791	-.250071	-.453586 .546414	.352263	.204508	.102983	.040907	.009107	-.001702	.000000
.4	.000000	-.059975	-.159537	-.302201	-.486732 .513268	.330197	.191392	.096440	.025771	.009502	.000000
.5	.000000	-.029249	-.087423	-.182294	-.319783	-.500000 .500000	.319783	.182294	.087423	.029249	.000000
.6	.000000	-.009593	-.028771	-.096440	-.191392	-.330197	-.513268 .486732	.302201	.159537	.059975	.000000
.7	.000000	.001701	-.009107	-.040909	-.102983	-.204508	-.352263	-.546414 .453586	.250071	.103751	.000000
.8	.000000	.007294	.006703	-.009339	-.049593	-.122816	-.241443	-.408818	-.624194 .375806	.160752	.000000
.9	.000000	.009440	.013409	.005095	-.023634	-.082322	-.181171	-.328966	-.529097	-.773042 .226958	.000000
1.0	.000000	.009861	.014928	.008560	-.016814	-.070968	-.163766	-.304801	-.498609	-.729040	-1.000000 .000000

ξ_{VM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-2.551589	-2.572743	-2.194474	-1.672561	-1.156458	-.717591	-.280900	-.144202	.005847	.084581	.102932
.1	-1.665743	-2.563267	-2.248752	-1.741250	-1.221370	-.770896	-.420197	-.170402	-.009397	.077525	.101273
.2	-1.273792	-1.910947	-2.253232	-1.926755	-1.419109	-.944806	-.555750	-.265875	-.069613	.045265	.089440
.3	-.776618	-1.391204	-1.763684	-2.145056	-1.717653	-1.238831	-.803664	-.453502	-.193118	-.032180	.053496
.4	-.416132	-.790356	-1.207452	-1.644860	-2.026355	-1.616522	-1.161302	-.749239	-.419034	-.179495	-.026026
.5	-.172527	-.422960	-.752825	-1.155107	-1.595889	-1.990024	-1.595890	-1.155102	-.752824	-.422969	-.172520
.6	-.026025	-.179492	-.419034	-.749238	-1.161302	-1.616522	-2.026355	-1.644860	-1.207452	-.790356	-.416132
.7	.053497	-.032177	-.193118	-.453501	-.803663	-1.238831	-1.717653	-2.145056	-1.763684	-1.391205	-.776618
.8	.089440	.045264	-.069613	-.265875	-.555750	-.944806	-1.419109	-1.926755	-2.253232	-1.910947	-1.273792
.9	.101275	.077527	-.009400	-.170404	-.420197	-.770895	-1.221371	-1.741250	-2.248753	-2.563267	-1.665743
1.0	.102033	.084583	.005851	-.144237	-.280895	-.717538	-1.156457	-1.672050	-2.194472	-2.572743	-2.551589

TABLO 3.12 a $\alpha L=4.0$ $\beta L=2.0$

ξ_{yP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.004810	.003642	.002625	.001814	.001205	.000769	.000459	.000270	.000139	.000047	-.000033
.1	.003642	.003497	.003036	.002420	.001818	.001303	.000897	.000590	.000353	.000191	.000047
.2	.002625	.003036	.003219	.002944	.002426	.001868	.001366	.000952	.000625	.000353	.000139
.3	.001814	.002420	.002944	.003192	.002953	.002450	.001894	.001385	.000952	.000590	.000270
.4	.001205	.001818	.002426	.002953	.003203	.002963	.002458	.001894	.001366	.000897	.000459
.5	.000769	.001303	.001868	.002450	.002963	.003207	.002963	.002450	.001868	.001303	.000769
.6	.000459	.000897	.001366	.001894	.002458	.002963	.003203	.002953	.002426	.001818	.001205
.7	.000270	.000590	.000952	.001385	.001894	.002450	.002953	.003192	.002944	.002420	.001814
.8	.000139	.000353	.000625	.000952	.001366	.001868	.002426	.002944	.003219	.003036	.002625
.9	.000047	.000191	.000353	.000590	.000897	.001303	.001818	.002420	.003036	.003497	.003642
1.0	-.000033	.000047	.000139	.000270	.000459	.000769	.001205	.001814	.002625	.003642	.004810

$\xi_{\varphi P}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.012010	-.011087	-.009169	-.007064	-.005162	-.003613	-.002441	-.001611	-.001071	-.000771	-.000676
.1	-.000754	-.002911	-.005773	-.006274	-.005650	-.004611	-.003542	-.002628	-.001949	-.001533	-.001392
.2	.004413	.003458	-.000445	-.004424	-.005613	-.005396	-.004599	-.003634	-.002900	-.002379	-.002192
.3	.006148	.005853	.004214	.000030	-.004188	-.005529	-.005421	-.004726	-.003941	-.003251	-.003127
.4	.006107	.006160	.005881	.004335	.000045	-.004194	-.005576	-.005548	-.004969	-.004427	-.004188
.5	.005272	.005472	.005802	.005697	.004249	.000000	-.004249	-.005697	-.005802	-.005472	-.005272
.6	.004188	.004427	.004969	.005548	.005576	.004194	-.000045	-.004335	-.005881	-.006160	-.006107
.7	.003127	.003251	.003941	.004726	.005421	.005529	.004188	-.000030	-.004214	-.005853	-.006148
.8	.002192	.002379	.002900	.003634	.004599	.005396	.005613	.004424	.000445	-.003458	-.004413
.9	.001392	.001533	.001949	.002628	.003542	.004611	.005650	.006274	.005773	.002911	.000754
1.0	.000676	.000771	.001071	.001611	.002441	.003613	.005162	.007064	.009169	.011087	.012010

ξ_{MP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.016016	-.021041	-.020428	-.017270	-.013579	-.009930	-.006762	-.004127	-.001928	.000000
.1	.000000	.046374	.014198	-.002153	-.009173	-.010579	-.010117	-.008040	-.005498	-.002601	.000000
.2	.000000	.021253	.060317	.022933	.003100	-.006086	-.009119	-.008781	-.006679	-.003641	.000000
.3	.000000	.007249	.026122	.062316	.024908	.004329	-.005089	-.008015	-.007226	-.004297	.000000
.4	.000000	-.000092	.007203	.026140	.063425	.025099	.004915	-.004054	-.006271	-.004430	.000000
.5	.000000	-.002256	-.002294	.005877	.025463	.052287	.025463	.005877	-.002294	-.002256	.000000
.6	.000000	-.004430	-.006271	-.004054	.004915	.025099	.063425	.026140	.007203	-.000092	.000000
.7	.000000	-.004297	-.007226	-.008015	-.005089	.004329	.024908	.062316	.026122	.007249	.000000
.8	.000000	-.003641	-.006679	-.008781	-.009119	-.006086	.003100	.022922	.060317	.021253	.000000
.9	.000000	-.002601	-.005498	-.008040	-.010117	-.010579	-.009172	-.002153	.014198	.046374	.000000
1.0	.000000	-.001928	-.004127	-.006762	-.009930	-.013579	-.017270	-.020428	-.021041	-.016016	.000000

ξ_{VP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.759476										
	-.240524	-.093954	-.015207	.022232	.036316	.038106	.034354	.028937	.023937	.020341	.018513
.1	.374505	.570137									
		-.429863	-.229574	-.108273	-.038711	-.001550	.015422	.022910	.026448	.027421	.028761
.2	.151239	.257701	.507727								
			-.492263	-.272174	-.135853	-.055235	-.009972	.014120	.026590	.032546	.035131
.3	.030133	.121766	.266717	.492667							
				-.506333	-.280788	-.140129	-.055864	-.007208	.020425	.035908	.048621
.4	-.026513	.030529	.122300	.267499	.494971						
					-.505029	-.278588	-.136522	-.050172	.001427	.033017	.054513
.5	-.051155	-.014574	.040813	.129729	.272212	.500000					
						-.500000	-.272212	-.129729	-.040813	.014574	.051155
.6	-.054514	-.033017	-.001427	.050173	.136522	.278588	.505029				
							-.494971	-.267498	-.122300	-.030529	.026512
.7	-.048621	-.035909	-.020425	.007208	.055864	.140129	.280788	.506333			
								-.492567	-.266717	-.121766	-.030133
.8	-.035122	-.032647	-.026591	-.014120	.009972	.055235	.135853	.272174	.492263		
									-.507737	-.257712	-.151239
.9	-.028761	-.027422	-.026448	-.022910	-.015422	.001549	.038711	.108271	.229574	.429863	
										-.570137	-.374505
1.0	-.018513	-.020341	-.023934	-.028937	-.034354	-.038106	-.036316	-.022232	.015207	.093954	.240524
											-.759476

TABLO 3.12 b $\alpha L=4.0$ $\beta L=2.0$

ξ_{yM}

z/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.012010	-.000754	.004413	.006148	.006107	.005272	.004188	.003127	.002192	.001392	.000676
.1	-.011087	-.002911	.003458	.005662	.006160	.005472	.004427	.003351	.002379	.001523	.000771
.2	-.009160	-.005772	-.000445	.004314	.005881	.005802	.004989	.003941	.002900	.001949	.001071
.3	-.007064	-.006274	-.004424	.000030	.004335	.005597	.005548	.004726	.003684	.002628	.001611
.4	-.005162	-.005650	-.006013	-.004188	.000045	.004249	.005576	.005421	.004595	.003542	.002441
.5	-.003612	-.004611	-.005395	-.005539	-.004194	.000000	.004194	.005539	.005395	.004611	.003612
.6	-.002441	-.003542	-.004599	-.005421	-.005576	-.004249	-.000045	.004188	.006013	.005650	.005162
.7	-.001611	-.002628	-.003684	-.004726	-.005548	-.005597	-.004335	-.000030	.004424	.006274	.007064
.8	-.001071	-.001949	-.002900	-.003941	-.004989	-.005802	-.005881	-.004314	.000445	.005772	.009160
.9	-.000771	-.001523	-.002379	-.003351	-.004427	-.005472	-.006160	-.005662	-.003458	.002911	.011087
1.0	-.000676	-.001392	-.002192	-.003127	-.004188	-.005272	-.006107	-.006148	-.004413	.000754	.012010

$\xi_{\varphi M}$

z/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.155129	.075666	.031044	.006253	-.005590	-.010227	-.011009	-.010057	-.008629	-.007462	-.007000
.1	.075666	.092210	.039993	.011132	-.003337	-.009412	-.010954	-.010357	-.009064	-.007925	-.007462
.2	.031044	.039993	.070840	.038392	.005482	-.005579	-.009883	-.010684	-.010062	-.009064	-.008629
.3	.006258	.011132	.038392	.064545	.035326	.004255	-.005873	-.009831	-.010684	-.010357	-.010057
.4	-.005590	-.003337	.005482	.035326	.063051	.034724	.004101	-.005873	-.009883	-.010954	-.011009
.5	-.010227	-.009412	-.005579	.004255	.034724	.062824	.034724	.004255	-.005579	-.009412	-.010227
.6	-.011009	-.010954	-.009883	-.005873	.004101	.034724	.063050	.035326	.005482	-.003337	-.005590
.7	-.010057	-.010357	-.010684	-.009831	-.005873	.004255	.035326	.064545	.038392	.011132	.006253
.8	-.008629	-.009062	-.010002	-.010684	-.009883	-.005579	.005482	.038392	.070840	.039993	.031044
.9	-.007462	-.007925	-.009063	-.010357	-.010954	-.009412	-.003337	.011132	.039992	.092210	.075666
1.0	-.007000	-.007462	-.008629	-.010057	-.011009	-.010227	-.005590	.006258	.031044	.075666	.155129

ξ_{MM}

z/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000 1.000000	.597017	.325105	.172115	.075757	.022528	-.003539	-.013470	-.013995	-.008723	.000001
.1	.000000	-.331823 .678177	.337497	.204485	.094766	.033063	.001668	-.011260	-.013231	-.008652	.000001
.2	.000000	-.187554	-.443948 .556052	.311376	.159484	.070056	.021306	-.001984	-.009673	-.007563	.000001
.3	.000000	-.101248	-.253837	-.485279 .514721	.287007	.146278	.064112	.020062	.000139	-.004721	.000001
.4	.000000	-.049562	-.124143	-.274014	-.497135 .502864	.280617	.143463	.062700	.021439	.003118	.000000
.5	.000000	-.019355	-.052199	-.142079	-.278822	-.500000 .500000	.278822	.142079	.052199	.019356	.000000
.6	.000000	-.003118	-.021439	-.062700	-.143463	-.280617	-.502864 .497135	.274014	.134143	.049562	.000000
.7	.000000	.004722	-.000139	-.020062	-.064112	-.146278	-.287007	-.514721 .485279	.253957	.101948	.000000
.8	.000000	.007563	.009673	.001984	-.021307	-.070056	-.159484	-.311376	-.556052 .443948	.187554	.000000
.9	.000000	.008654	.013232	.011260	-.001667	-.033062	-.094765	-.204486	-.337497	-.678176 .321824	.000000
1.0	.000000	.008723	.013995	.013469	.003535	-.022528	-.075767	-.172115	-.325106	-.597017	-1.000000 .000000

ξ_{VM}

z/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-4.900035	-3.245685	-2.062649	-1.250775	-.714051	-.274592	-.156379	-.043267	.028365	.071628	.101762
.1	-2.926292	-3.584457	-2.302980	-1.414384	-.821571	-.441416	-.205951	-.064903	.018016	.069746	.102546
.2	-1.642447	-2.150010	-3.034922	-1.924724	-1.153397	-.650604	-.340078	-.141599	-.021772	.052375	.102167
.3	-.844740	-1.227660	-1.861577	-2.829129	-1.787540	-1.074221	-.602914	-.301146	-.112202	.006056	.083519
.4	-.371619	-.642666	-1.082501	-1.751340	-2.762123	-1.742685	-1.045384	-.592753	-.294813	-.095953	.025047
.5	-.108576	-.252885	-.556210	-1.044077	-1.736572	-2.747486	-1.736571	-1.044077	-.556315	-.252882	-.108575
.6	.025044	-.095953	-.294813	-.592752	-1.045384	-1.742684	-2.762122	-1.751340	-1.082501	-.642666	-.371619
.7	.083514	.006053	-.112204	-.301147	-.602915	-1.074221	-1.787540	-2.829139	-1.861577	-1.227659	-.844740
.8	.102199	.052375	-.021773	-.141597	-.340078	-.650604	-1.153396	-1.924723	-3.034922	-2.150009	-1.642446
.9	.102545	.069748	.018213	-.064904	-.205951	-.441419	-.821872	-1.414385	-2.302981	-3.584457	-2.926291
1.0	.101759	.071626	.028364	-.043268	-.156380	-.274593	-.714960	-1.250775	-2.062649	-3.245685	-4.900035

TABLO 3.13 a $\alpha L=4.0$ $\beta L=3.0$

ξ_{yP}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.004642	.003242	.002066	.001190	.000595	.000228	.000024	-.000073	-.000108	-.000110	-.000100
.1	.003242	.002992	.002452	.001798	.001203	.000735	.000401	.000180	.000042	-.000045	-.000110
.2	.002066	.002452	.002616	.002327	.001809	.001275	.000822	.000476	.000225	.000042	-.000108
.3	.001190	.001798	.002327	.002579	.002339	.001843	.001312	.000848	.000476	.000180	-.000073
.4	.000595	.001203	.001809	.002339	.002592	.002353	.001854	.001312	.000822	.000401	.000024
.5	.000229	.000735	.001275	.001843	.002353	.002597	.002353	.001843	.001275	.000735	.000229
.6	.000024	.000401	.000822	.001312	.001854	.002353	.002592	.002339	.001809	.001203	.000595
.7	-.000073	.000180	.000476	.000848	.001312	.001843	.002339	.002579	.002327	.001798	.001190
.8	-.000108	.000042	.000225	.000476	.000822	.001275	.001809	.002327	.002616	.002452	.002066
.9	-.000110	-.000045	.000042	.000180	.000401	.000735	.001203	.001798	.002452	.002992	.003242
1.0	-.000100	-.000110	-.000108	-.000073	.000024	.000228	.000595	.001190	.002066	.003242	.004642

$\xi_{\varphi P}$

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.014504	-.013119	-.010285	-.007278	-.004702	-.002755	-.001423	-.000596	-.000141	.000062	.000113
.1	-.001859	-.003959	-.006375	-.006428	-.005368	-.003994	-.002724	-.001737	-.001077	-.000719	-.000614
.2	.004149	.003238	-.000620	-.004514	-.005500	-.005028	-.004003	-.002944	-.002111	-.001607	-.001446
.3	.006164	.005897	.004352	.000039	-.004178	-.005383	-.005067	-.004183	-.003289	-.002677	-.002466
.4	.006048	.006116	.005887	.004376	.000057	-.004181	-.005444	-.005241	-.004542	-.003925	-.003687
.5	.004994	.005203	.005602	.005613	.004252	.000000	-.004252	-.005613	-.005602	-.005203	-.004994
.6	.003687	.003925	.004542	.005241	.005444	.004181	-.000057	-.004376	-.005887	-.006116	-.006048
.7	.002466	.002677	.003289	.004132	.005067	.005383	.004178	-.000039	-.004352	-.005897	-.006164
.8	.001447	.001607	.002111	.002944	.004003	.005028	.005500	.004514	.000620	-.003238	-.004149
.9	.000614	.000719	.001077	.001737	.002724	.003994	.005368	.006428	.006375	.003959	.001859
1.0	-.000112	-.000062	.000141	.000596	.001423	.002755	.004702	.007278	.010285	.013119	.014504

ξ_{MP}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.023947	-.030667	-.028508	-.022717	-.016260	-.010578	-.006188	-.003106	-.001128	.000000
.1	.000000	.043731	.010046	-.006765	-.013129	-.013676	-.011444	-.008239	-.005019	-.002215	.000000
.2	.000000	.020792	.059924	.021470	.000657	-.008628	-.011027	-.009734	-.006764	-.003291	.000000
.3	.000000	.006963	.026244	.062818	.024101	.002455	-.007207	-.009557	-.007850	-.004208	.000000
.4	.000000	-.000447	.006652	.026097	.063887	.024476	.003278	-.005753	-.007273	-.004590	.000000
.5	.000000	-.003725	-.003313	.004709	.025022	.063622	.025022	.004709	-.003313	-.003725	.000000
.6	.000000	-.004590	-.007273	-.005753	.003278	.024476	.063887	.026098	.006652	-.000447	.000000
.7	.000000	-.004208	-.007850	-.009557	-.007207	.002455	.024101	.062818	.026244	.006963	.000000
.8	.000000	-.003291	-.006764	-.009734	-.011027	-.008628	.000657	.021470	.059924	.020792	.000000
.9	.000000	-.002215	-.005019	-.008229	-.011444	-.013676	-.013129	-.006765	.010046	.043731	.000000
1.0	.000000	-.001128	-.003106	-.006188	-.010578	-.016260	-.022717	-.028508	-.030667	-.023947	.000000

ξ_{VP}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.637322 / -.362678	-.136440	-.011749	.046318	.064689	.062158	.050686	.037133	.024875	.015117	.007314
.1	.329230	.553057 / -.446943	-.240274	-.106680	-.028276	.012332	.029269	.033186	.030547	.025267	.018885
.2	.135160	.289573	.503949 / -.496051	-.285053	-.141468	-.051952	-.001306	.023856	.033658	.034705	.030325
.3	.024983	.122228	.273422	.489484 / -.510516	-.295643	-.147505	-.053513	.001147	.029516	.041115	.041395
.4	-.026972	.026243	.123706	.275259	.492018 / -.507982	-.291951	-.142170	-.046198	.010242	.029574	.049288
.5	-.048582	-.021529	.035478	.132740	.283591	.500000 / -.500000	-.283591	-.132740	-.035478	.021529	.048582
.6	-.049389	-.039574	-.010341	.046198	.142170	.291951	.507982 / -.492018	-.275259	-.123705	-.026243	.028972
.7	-.041395	-.041114	-.029516	-.001147	.053513	.147505	.295643	.510516 / -.489484	-.273422	-.122228	-.024983
.8	-.030325	-.034706	-.033659	-.023856	.001306	.051952	.141468	.285053	.496051 / -.503949	-.289573	-.135150
.9	-.018885	-.025267	-.030547	-.033186	-.029269	-.012333	.028276	.106680	.240274	.446943 / -.553057	-.329230
1.0	-.007812	-.015117	-.024875	-.037133	-.050687	-.062158	-.064689	-.046318	.011749	.130429	.362678 / -.637322

$\alpha L=4.0 \quad \beta L=3.0$

TABLO 3.13 b

ξ_{yM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.014504	-.001858	.004149	.006164	.006048	.004994	.003697	.002466	.001447	.000614	-.000112
.1	-.013119	-.003858	.003238	.005897	.006116	.005203	.003925	.002677	.001607	.000719	-.000062
.2	-.010265	-.006375	-.000620	.004362	.005887	.005602	.004542	.003289	.002111	.001077	.000141
.3	-.007278	-.006428	-.004514	.000039	.004376	.005613	.005241	.004183	.002944	.001737	.000596
.4	-.004702	-.005368	-.005500	-.004178	.000057	.004252	.005444	.005067	.004003	.002724	.001423
.5	-.002755	-.003994	-.005028	-.005383	-.004181	.000000	.004181	.005383	.005028	.003994	.002755
.6	-.001423	-.002724	-.004003	-.005067	-.005444	-.004252	-.000057	.004178	.005500	.005368	.004702
.7	-.000596	-.001737	-.002944	-.004183	-.005241	-.005613	-.004376	-.000039	.004514	.006428	.007278
.8	-.000141	-.001077	-.002111	-.003289	-.004542	-.005602	-.005887	-.004362	.000620	.006375	.010265
.9	.000062	-.000719	-.001607	-.002677	-.003925	-.005203	-.006116	-.005897	-.003238	.003858	.013119
1.0	.000112	-.000614	-.001447	-.002466	-.003697	-.004994	-.006048	-.006164	-.004149	.001858	.014504

$\xi_{\varphi M}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.170466	.088176	.036376	.007004	-.007360	-.012609	-.012978	-.011264	-.009167	-.007628	-.007080
.1	.088176	.101772	.044801	.011688	-.005144	-.011877	-.013041	-.011687	-.009710	-.008184	-.007628
.2	.036376	.044801	.074378	.029210	.004014	-.008020	-.012225	-.012406	-.011062	-.009710	-.009167
.3	.007004	.011688	.029210	.065510	.024845	.002360	-.008290	-.012041	-.012406	-.011687	-.011264
.4	-.007360	-.005144	.004014	.024845	.063361	.024022	.002191	-.008290	-.012225	-.013041	-.012978
.5	-.012609	-.011877	-.008020	.002360	.024022	.063058	.024022	.002360	-.008020	-.011877	-.012609
.6	-.012978	-.013041	-.012225	-.008290	.002191	.024022	.063361	.024845	.004014	-.005144	-.007360
.7	-.011264	-.011687	-.012406	-.012041	-.008290	.002360	.024845	.065510	.029210	.011688	.007004
.8	-.009167	-.009710	-.011062	-.012406	-.012225	-.008020	.004014	.029210	.074378	.044801	.036376
.9	-.007628	-.008184	-.009710	-.011687	-.013041	-.011877	-.005144	.011688	.044801	.101772	.088176
1.0	-.007080	-.007628	-.009167	-.011264	-.012978	-.012609	-.007360	.007004	.036376	.088176	.170466

ξ_{MM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000 1.000000	.657298	.392493	.207447	.085662	.022243	-.010357	-.021159	-.019252	-.010827	.000000
.1	.000000	-.284039 .715961	.436983	.238071	.108907	.032265	-.004950	-.019025	-.018771	-.010915	.000000
.2	.000000	-.179207	-.423160 .576840	.339449	.175932	.073627	.016781	-.009061	-.015240	-.010367	.000000
.3	.000000	-.101946	-.258435	-.478707 .521293	.304172	.156199	.065015	.015929	-.004750	-.007365	.000000
.4	.000000	-.050084	-.140939	-.285791	-.496034 .503966	.294625	.152347	.065266	.019119	.000886	.000000
.5	.000000	-.018227	-.064428	-.151091	-.292390	-.500000 .500000	.292390	.151091	.064428	.018227	.000000
.6	.000000	-.000887	-.019120	-.065266	-.152347	-.294625	-.503966 .496034	.285791	.140939	.050084	.000000
.7	.000000	.007364	.004749	-.015929	-.065015	-.156199	-.304172	-.521293 .478707	.258435	.101946	.000000
.8	.000000	.010366	.015240	.009060	-.016781	-.072627	-.175932	-.339449	-.576840 .423160	.179207	.000000
.9	.000000	.010915	.018771	.019025	.004950	-.032264	-.108907	-.238071	-.436983	-.715961 .284039	.000000
1.0	.000000	.010829	.019254	.021159	.010358	-.022243	-.085662	-.207447	-.392493	-.657297	-1.000000 .000000

ξ_{VM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-3.743262	-3.059724	-2.226040	-1.487331	-.897190	-.475939	-.199315	-.031930	.059889	.101928	.109643
.1	-2.461625	-3.189522	-2.381729	-1.615526	-.995761	-.544323	-.242205	-.055571	.049594	.100141	.112598
.2	-1.471314	-2.114223	-2.762238	-1.989476	-1.303376	-.769662	-.391617	-.144278	.004959	.084931	.115100
.3	-.778848	-1.275142	-1.871451	-2.538325	-1.809952	-1.171352	-.677587	-.328643	-.100643	.035192	.101948
.4	-.336764	-.683597	-1.156182	-1.761077	-2.449079	-1.743243	-1.123287	-.642681	-.302132	-.080092	.048603
.5	-.081185	-.302728	-.640644	-1.116634	-1.729938	-2.427424	-1.729998	-1.116635	-.640643	-.302720	-.081185
.6	.048602	-.080090	-.302131	-.642679	-1.123287	-1.743243	-2.449079	-1.761078	-1.156182	-.683597	-.336765
.7	.101949	.035197	-.100643	-.328640	-.677586	-1.171352	-1.809953	-2.538325	-1.871451	-1.275143	-.778848
.8	.115104	.084934	.004958	-.144275	-.391618	-.769662	-1.303376	-1.989476	-2.762238	-2.114222	-1.471314
.9	.112602	.100140	.049597	-.055571	-.242206	-.544322	-.995762	-1.615527	-2.381730	-3.189522	-2.461625
1.0	.109640	.101927	.059891	-.031921	-.199318	-.475940	-.897190	-1.487331	-2.226040	-3.059724	-3.743262

TABLO 3.14 a $\alpha L=5.0$ $\beta L=3.0$

ξ_{yP}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.002403	.001520	.000994	.000557	.000279	.000119	.000025	-.000003	-.000017	-.000019	-.000017
.1	.001520	.001509	.001331	.000951	.000613	.000351	.000193	.000091	.000033	.000001	-.000019
.2	.000994	.001331	.001502	.001314	.000972	.000643	.000389	.000215	.000103	.000033	-.000017
.3	.000557	.000951	.001314	.001500	.001219	.000979	.000651	.000395	.000215	.000091	-.000003
.4	.000279	.000613	.000972	.001219	.001499	.001218	.000979	.000651	.000389	.000193	.000025
.5	.000119	.000351	.000643	.000979	.001218	.001497	.001218	.000979	.000643	.000351	.000119
.6	.000025	.000193	.000389	.000651	.000979	.001218	.001499	.001219	.000972	.000613	.000279
.7	-.000003	.000091	.000215	.000395	.000651	.000979	.001219	.001500	.001314	.000951	.000557
.8	-.000017	.000033	.000103	.000215	.000389	.000643	.000972	.001314	.001502	.001331	.000994
.9	-.000019	.000001	.000033	.000091	.000193	.000351	.000613	.000951	.001331	.001509	.001520
1.0	-.000017	-.000019	-.000017	-.000003	.000025	.000119	.000279	.000557	.000994	.001520	.002400

$\xi_{\varphi P}$

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.008159	-.007165	-.005301	-.003508	-.002115	-.001161	-.000568	-.000232	-.000062	.000007	.000024
.1	.000459	-.001373	-.003651	-.003724	-.002972	-.002074	-.001312	-.000755	-.000421	-.000242	-.000189
.2	.002547	.002325	-.000069	-.003069	-.003521	-.002950	-.002127	-.001395	-.000869	-.000568	-.000472
.3	.002940	.003910	.002132	.000008	-.003027	-.002508	-.002953	-.002151	-.001477	-.001042	-.000895
.4	.003265	.003455	.003669	.002025	-.000012	-.003015	-.003497	-.002979	-.002258	-.001714	-.001514
.5	.002339	.002572	.002107	.002525	.003001	.000000	-.003001	-.002525	-.002107	-.002572	-.002339
.6	.001514	.001714	.002258	.002979	.003497	.003015	.000012	-.002025	-.003669	-.003455	-.003265
.7	.000895	.001042	.001477	.002151	.002959	.002508	.003027	-.000008	-.002132	-.003910	-.002940
.8	.000472	.000568	.000869	.001395	.002127	.002950	.003521	.003069	.000069	-.002325	-.002547
.9	.000189	.000242	.000421	.000755	.001312	.002074	.002972	.003724	.003651	.001373	-.000459
1.0	-.000024	-.000007	.000062	.000232	.000568	.001161	.002115	.003508	.005301	.007165	.008159

ξ_{MP}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.016574	-.019207	-.016161	-.011663	-.007566	-.004472	-.002359	-.001106	-.000379	.000000
.1	.000000	.040926	.009692	-.004098	-.008975	-.008552	-.006573	-.004259	-.002544	-.001104	.000000
.2	.000000	.014787	.050082	.012650	-.002369	-.007812	-.008110	-.006372	-.004116	-.001945	.000000
.3	.000000	.002069	.016092	.050819	.014340	-.002149	-.007506	-.007754	-.005710	-.002929	.000000
.4	.000000	-.003053	.000192	.015027	.050305	.014091	-.001592	-.007092	-.006729	-.003891	.000000
.5	.000000	-.004314	-.005721	-.001315	.014284	.050077	.014284	-.001315	-.005721	-.004314	.000000
.6	.000000	-.003891	-.006729	-.007092	-.001592	.014091	.050305	.015027	.000192	-.003053	.000000
.7	.000000	-.002929	-.005710	-.007754	-.007506	-.002149	.014340	.050819	.016092	.002069	.000000
.8	.000000	-.001945	-.004116	-.006372	-.008110	-.007812	-.002369	.012650	.050082	.014787	.000000
.9	.000000	-.001104	-.002544	-.004298	-.006573	-.008552	-.008975	-.004568	.009692	.040925	.000000
1.0	.000000	-.000379	-.001106	-.002359	-.004472	-.007566	-.011663	-.016161	-.019207	-.016574	.000000

ξ_{VP}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.722600 -.277400	-.077558	.011812	.042341	.044735	.036289	.025624	.016412	.009652	.005242	.002575
.1	.295544	.543815 -.456185	-.211225	-.076949	-.011394	.015256	.022157	.020552	.016421	.012522	.005753
.2	.077780	.222202	.405715 -.594285	-.243298	-.096292	-.021772	.010792	.021551	.022226	.020599	.013397
.3	-.019035	.069078	.225613	.491242 -.508758	-.245929	-.097189	-.021164	.012015	.025597	.029050	.025295
.4	-.050782	-.005513	.079014	.222268	.495582 -.504418	-.242669	-.094066	-.016954	.019297	.035125	.041725
.5	-.052001	-.031940	.008458	.083422	.238405	.500000 -.500000	-.238405	-.083422	-.008458	.031941	.052001
.6	-.041725	-.035132	-.019297	.016954	.094066	.242669	.504418 -.495582	-.222268	-.079014	.005513	.050782
.7	-.029288	-.029046	-.025597	-.012014	.021164	.097189	.245929	.508758 -.491242	-.225614	-.069078	.019035
.8	-.018395	-.020598	-.022626	-.021550	-.010792	.021773	.096293	.243298	.594285 -.405714	-.222202	-.077780
.9	-.009752	-.012520	-.016421	-.020551	-.022157	-.015255	.011395	.076949	.211230	.456185 -.543815	-.295544
1.0	-.002573	-.005229	-.009651	-.016411	-.025624	-.036289	-.044735	-.042341	-.011812	.077558	.277400 -.722600

TABLO 3.14 b $\alpha L=5.0$ $\beta L=3.0$

ξ_{yM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.008159	.000469	.002547	.003940	.003365	.002339	.001514	.000895	.000472	.000189	-.000024
.1	-.007155	-.001373	.002925	.003910	.003455	.002572	.001714	.001042	.000568	.000242	-.000007
.2	-.005301	-.002651	-.000059	.003132	.003669	.003107	.002258	.001477	.000859	.000421	.000063
.3	-.003508	-.003724	-.002069	.000008	.003035	.003525	.002979	.002151	.001395	.000765	.000232
.4	-.002115	-.002972	-.003521	-.003027	-.000013	.003001	.003497	.002958	.002127	.001312	.000568
.5	-.001151	-.002074	-.002950	-.003508	-.003015	.000000	.003015	.003508	.002950	.002074	.001151
.6	-.000568	-.001312	-.002127	-.002958	-.003497	-.003001	.000013	.003027	.003521	.002972	.002115
.7	-.000232	-.000765	-.001395	-.002151	-.002979	-.003525	-.003035	-.000008	.002069	.003724	.003508
.8	-.000063	-.000421	-.000859	-.001477	-.002258	-.003107	-.003669	-.003132	.000059	.002651	.005301
.9	.000007	-.000242	-.000568	-.001042	-.001714	-.002572	-.003455	-.003910	-.002925	.001373	.007155
1.0	.000024	-.000189	-.000472	-.000895	-.001514	-.002339	-.003365	-.003940	-.002547	-.000469	.008159

$\xi_{\varphi M}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.127754	.052447	.013790	-.003302	-.008889	-.009081	-.007267	-.005137	-.003420	-.002364	-.002015
.1	.052447	.059293	.022260	.000322	-.007603	-.009155	-.007753	-.005691	-.003890	-.002750	-.002364
.2	.013790	.022260	.053689	.015302	-.002000	-.007937	-.008480	-.006990	-.005193	-.003890	-.003420
.3	-.003302	.000322	.015302	.050590	.014280	-.002046	-.007644	-.008213	-.006990	-.005691	-.005137
.4	-.008889	-.007603	-.002000	.014280	.050272	.014286	-.001956	-.007644	-.008480	-.007753	-.007267
.5	-.009081	-.009155	-.007937	-.002046	.014286	.050296	.014286	-.002046	-.007937	-.009155	-.009081
.6	-.007267	-.007753	-.008480	-.007644	-.001956	.014286	.050272	.014280	-.002000	-.007603	-.008889
.7	-.005137	-.005691	-.006990	-.008213	-.007644	-.002046	.014280	.050590	.015302	.000322	-.003302
.8	-.003420	-.003890	-.005193	-.006990	-.008480	-.007937	-.002000	.015302	.053689	.022260	.013790
.9	-.002364	-.002750	-.003890	-.005691	-.007753	-.009155	-.007603	.000322	.022260	.059293	.052447
1.0	-.002015	-.002364	-.003420	-.005137	-.007267	-.009081	-.008889	-.003302	.013790	.052447	.127754

ξ_{IaM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000										
	1.000000	.540155	.258070	.100343	.021366	-.012047	-.021539	-.019927	-.014041	-.007927	-.000000
.1	.000000	-.254141									
		.545859	.221927	.135456	.038563	-.005016	-.019691	-.020277	-.014959	-.007591	.000000
.2	.000000	-.182028	-.466799								
			.533201	.250555	.102595	.024987	-.008595	-.018251	-.015230	-.009159	.000000
.3	.000000	-.081395	-.223940	-.495154							
				.504836	.244245	.097531	.022741	-.007125	-.014517	-.010221	.000000
.4	.000000	-.027178	-.098293	-.242530	-.500004						
					.499996	.242306	.097611	.025476	-.003427	-.008192	.000000
.5	.000000	-.001575	-.028255	-.098981	-.242883	-.500000					
						.500000	.242883	.098980	.028255	.001575	.000000
.6	.000000	.008197	.003426	-.025477	-.097611	-.242306	-.499996				
							.500004	.242530	.098293	.027178	.000000
.7	.000000	.010219	.014517	.007124	-.022741	-.097532	-.244245	-.504836			
								.495154	.223940	.081395	.000000
.8	.000000	.009152	.015230	.018250	.008595	-.024987	-.102595	-.250555	-.533201		
									.466799	.182028	.000000
.9	.000000	.007225	.014970	.020277	.019681	.005016	-.038566	-.135456	-.221927	-.545859	
										.254141	.000000
1.0	.000000	.007922	.014041	.019927	.021539	.012047	-.021366	-.100343	-.258070	-.540155	-1.000000
											.000000

ξ_{VM}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-5.557276	-3.619593	-2.113580	-1.117581	-.517037	-.186809	-.032902	.045147	.067519	.071085	.059130
.1	-2.056292	-4.104525	-2.454442	-1.345804	-.652371	-.259514	-.058036	.032928	.066971	.076331	.077063
.2	-1.460942	-2.257427	-2.509288	-2.068267	-1.105116	-.517899	-.189977	-.022258	.053105	.084772	.097269
.3	-.569046	-1.130449	-1.992751	-3.332717	-1.960162	-1.043009	-.402633	-.166834	-.001699	.079939	.119665
.4	-.123364	-.452130	-1.018527	-1.933609	-3.295516	-1.936823	-1.036017	-.455504	-.144102	.030717	.123335
.5	.067321	-.117171	-.447665	-1.015066	-1.920338	-3.251421	-1.920337	-1.015068	-.447666	-.117170	.067315
.6	.123325	.030724	-.144101	-.455501	-1.036018	-1.936822	-3.295515	-1.933610	-1.018527	-.452133	-.123365
.7	.119652	.079942	-.001697	-.166834	-.402633	-1.043008	-1.960162	-3.332718	-1.992751	-1.130451	-.569043
.8	.097259	.084754	.053095	-.022256	-.189978	-.517899	-1.105117	-2.068268	-2.509288	-2.257429	-1.460942
.9	.077046	.076177	.066962	.032922	-.058037	-.259514	-.652373	-1.345205	-2.454442	-4.104525	-2.056292
1.0	.059075	.071050	.067514	.045142	-.032902	-.186808	-.517028	-1.117581	-2.113579	-3.619592	-5.557275

TABLO 3.15 a $\alpha L=5.0$ $\beta L=4.0$

ξ_{yP}

y/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.003405	.001471	.000759	.000307	.000063	-.000043	-.000072	-.000065	-.000045	-.000025	-.000005
.1	.001471	.001405	.001090	.000701	.000383	.000170	.000049	-.000008	-.000028	-.000029	-.000025
.2	.000759	.001090	.001258	.001067	.000730	.000424	.000206	.000074	.000005	-.000028	-.000045
.3	.000307	.000701	.001067	.001254	.001072	.000738	.000432	.000212	.000074	-.000008	-.000065
.4	.000063	.000383	.000730	.001072	.001251	.001069	.000738	.000432	.000206	.000049	-.000072
.5	-.000043	.000170	.000424	.000738	.001069	.001347	.001069	.000738	.000424	.000170	-.000043
.6	-.000072	.000049	.000206	.000432	.000738	.001069	.001251	.001072	.000730	.000383	.000063
.7	-.000065	-.000008	.000074	.000212	.000432	.000738	.001072	.001254	.001067	.000701	.000307
.8	-.000045	-.000028	.000005	.000074	.000206	.000424	.000730	.001067	.001258	.001090	.000759
.9	-.000025	-.000029	-.000028	-.000008	.000049	.000170	.000383	.000701	.001090	.001405	.001471
1.0	-.000005	-.000025	-.000045	-.000065	-.000072	-.000043	.000063	.000307	.000759	.001471	.003405

$\xi_{\varphi P}$

y/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.009860	-.008420	-.005781	-.003363	-.001632	-.000588	-.000056	.000159	.000269	.000200	.000190
.1	-.000127	-.001851	-.002808	-.003563	-.002552	-.001628	-.000841	-.000344	-.000080	.000030	.000054
.2	.003487	.002397	-.000130	-.003075	-.003386	-.002651	-.001720	-.000959	-.000467	-.000230	-.000154
.3	.003945	.003920	.003156	.000003	-.003018	-.003371	-.002662	-.001750	-.001049	-.000643	-.000524
.4	.003129	.003219	.002580	.003012	-.000027	-.002997	-.003348	-.002681	-.001874	-.001323	-.001143
.5	.002049	.002272	.002848	.003379	.002967	.000000	-.002967	-.003379	-.002848	-.002272	-.002049
.6	.001143	.001323	.001874	.002681	.003348	.002997	.000027	-.003012	-.002580	-.003219	-.003129
.7	.000524	.000643	.001049	.001750	.002662	.003371	.003018	-.000003	-.003156	-.003920	-.003945
.8	.000154	.000230	.000467	.000959	.001720	.002651	.003386	.003075	.000130	-.002397	-.003487
.9	-.000054	-.000030	.000080	.000344	.000841	.001628	.002552	.003563	.002808	.001851	.000127
1.0	-.000191	-.000200	-.000269	-.000159	.000056	.000588	.001632	.003363	.005781	.008420	.009860

ξ_{MP}

y/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.022866	-.026661	-.021005	-.013660	-.007542	-.003426	-.001109	-.000082	.000156	.000001
.1	.000000	.039075	.005809	-.007884	-.010942	-.009319	-.006374	-.003675	-.001738	-.000570	.000000
.2	.000000	.014584	.050220	.012893	-.004064	-.009260	-.008789	-.006294	-.003604	-.001442	.000000
.3	.000000	.001911	.016106	.051212	.013452	-.003761	-.009016	-.008418	-.005528	-.002529	.000000
.4	.000000	-.002345	-.000511	.014585	.050421	.013202	-.003563	-.008347	-.007166	-.003687	.000000
.5	.000000	-.004349	-.006539	-.002605	.013480	.050066	.013480	-.002605	-.006539	-.004349	.000000
.6	.000000	-.003687	-.007166	-.008347	-.003563	.013202	.050421	.014585	-.000511	-.002345	.000000
.7	.000000	-.002529	-.005528	-.008419	-.009016	-.003761	.013452	.051212	.016106	.001911	.000000
.8	.000000	-.001442	-.003604	-.006294	-.008789	-.009260	-.004064	.012893	.050220	.014584	.000000
.9	.000000	-.000570	-.001738	-.003675	-.006374	-.009319	-.010942	-.007884	.005809	.039075	.000000
1.0	.000000	.000157	-.000082	-.001110	-.003426	-.007542	-.013660	-.021005	-.026661	-.022866	.000000

ξ_{VP}

y/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.595798 -.404202	-.106426	.029783	.072422	.069912	.051347	.031414	.015820	.005584	-.000150	-.002494
.1	.256192	.533315 -.466685	-.217525	-.071243	.000341	.026673	.029737	.023476	.015309	.008356	.003328
.2	.009257	.236100	.492141 -.507859	-.255362	-.098254	-.015675	.019136	.027833	.024862	.018116	.010675
.3	-.017680	.067501	.230926	.487091 -.512909	-.258865	-.099928	-.015324	.021301	.031502	.029117	.020669
.4	-.045358	-.011595	.076815	.229240	.493353 -.506647	-.254112	-.095530	-.010144	.027799	.038459	.033037
.5	-.044345	-.038019	.000650	.088010	.247818	.500000 -.500000	-.247818	-.088009	-.000649	.038020	.044345
.6	-.033037	-.038459	-.027799	.010144	.095530	.254112	.506647 -.493353	-.229240	-.076815	.011600	.045358
.7	-.020669	-.029118	-.031501	-.021301	.015324	.099928	.258865	.512909 -.487091	-.230926	-.067501	.017680
.8	-.010678	-.018120	-.024862	-.027833	-.019136	.015676	.098354	.255362	.507859 -.492141	-.236100	-.009257
.9	-.003336	-.008364	-.015309	-.023475	-.029737	-.026672	-.000340	.071243	.217525	.466685 -.533315	-.256192
1.0	.002495	.000152	-.005582	-.015819	-.031413	-.051347	-.069912	-.072423	-.029783	.106426	.404202 -.595792

TABLO 3.15 b $\alpha L=5.0$ $\beta L=4.0$

ξ_{yM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.009860	-.000127	.003487	.003945	.002129	.002049	.001143	.000524	.000154	-.000054	-.000190
.1	-.005420	-.001851	.002897	.002920	.003319	.002272	.001323	.000643	.000220	-.000030	-.000200
.2	-.005731	-.003888	-.000130	.003156	.002580	.002848	.001874	.001049	.000467	.000050	-.000209
.3	-.003363	-.003662	-.003075	.000003	.003012	.003378	.002681	.001750	.000959	.000344	-.000155
.4	-.001632	-.002662	-.003336	-.003018	-.000027	.002967	.003348	.002663	.001720	.000841	.000056
.5	-.000588	-.001628	-.002551	-.003371	-.002997	.000000	.002997	.003371	.002551	.001628	.000588
.6	-.000056	-.000841	-.001720	-.002662	-.003348	-.002967	.000027	.003018	.003336	.002662	.001632
.7	.000155	-.000244	-.000959	-.001750	-.002681	-.003378	-.003012	-.000003	.003075	.003662	.003363
.8	.000209	-.000050	-.000467	-.001049	-.001874	-.002848	-.002580	-.003156	.000130	.003888	.005731
.9	.000200	.000030	-.000220	-.000643	-.001322	-.002272	-.003319	-.002920	-.002897	.001851	.005420
1.0	.000191	.000054	-.000154	-.000524	-.001143	-.002049	-.002129	-.003945	-.003457	.000127	[illegible]

$\xi_{\varphi M}$

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.140425	.060872	.016358	-.004104	-.010590	-.010316	-.007647	-.004817	-.002722	-.001586	-.001257
.1	.060872	.075812	.024473	-.000531	-.009580	-.010500	-.008225	-.005407	-.003205	-.001954	-.001537
.2	.016359	.024473	.055273	.014927	-.003630	-.009521	-.009336	-.007037	-.004704	-.003205	-.002721
.3	-.004104	-.000531	.014927	.050842	.013507	-.003583	-.008998	-.008893	-.007037	-.005407	-.004817
.4	-.010590	-.009580	-.003630	.013507	.050420	.013566	-.003412	-.008998	-.009337	-.008226	-.007647
.5	-.010316	-.010500	-.009521	-.003583	.013566	.050477	.013566	-.003583	-.009521	-.010500	-.010316
.6	-.007647	-.008226	-.009337	-.008998	-.003412	.013566	.050420	.013507	-.003630	-.009580	-.010590
.7	-.004817	-.005407	-.007037	-.008893	-.008998	-.003583	.013507	.050842	.014927	-.000531	-.004104
.8	-.002722	-.003205	-.004704	-.007037	-.009337	-.009521	-.003630	.014927	.055273	.024473	.016359
.9	-.001587	-.001954	-.003205	-.005407	-.008225	-.010500	-.009580	-.000531	.024473	.075812	.060872
1.0	-.001259	-.001587	-.002722	-.004817	-.007647	-.010316	-.010590	-.004104	.016359	.060872	.140425

ξ_{MM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000 1.000000	.603331	.306187	.120123	.021594	-.019931	-.029862	-.025328	-.016129	-.007017	-.000004
.1	.000000	-.318021 .681979	.363052	.154719	.039328	-.012824	-.028386	-.026169	-.017386	-.007775	.000001
.2	.000000	-.178433	-.453255 .546745	.277583	.109026	.019909	-.017271	-.025394	-.019903	-.009802	-.000002
.3	.000000	-.082422	-.241212	-.493106 .506894	.256216	.100087	.018441	-.014364	-.019577	-.011729	.000000
.4	.000000	-.026510	-.102896	-.254378	-.500213 .499787	.253460	.100457	.021481	-.008476	-.010520	.000000
.5	.000000	.000659	-.026333	-.102986	-.254485	-.500000 .500000	.254485	.102986	.026333	-.000659	.000000
.6	.000000	.010521	.008470	-.021481	-.100457	-.253459	-.499787 .500213	.254378	.102896	.026509	.000000
.7	.000000	.011730	.019576	.014364	-.018441	-.100087	-.256216	-.506894 .493106	.241212	.082422	.000000
.8	.000000	.009805	.019903	.025394	.017271	-.019909	-.109026	-.277583	-.546745 .453255	.178433	.000000
.9	.000000	.007784	.017387	.026168	.028386	.012823	-.039328	-.154719	-.363052	-.681980 .318020	.000000
1.0	.000000	.007010	.016124	.025326	.029861	.019931	-.021594	-.120123	-.306187	-.603331	-1.000000 .000000

ξ_{VM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-4.243007	-3.538988	-2.393211	-1.371780	-.651528	-.221723	-.005222	.079984	.096507	.082713	.055781
.1	-2.560328	-3.713211	-2.629589	-1.571760	-.787899	-.300231	-.042251	.068307	.098162	.089926	.063427
.2	-1.300052	-2.269937	-3.205002	-2.168214	-1.242263	-.587592	-.194513	.006539	.088677	.105555	.085494
.3	-.511096	-1.170770	-2.036829	-2.991580	-2.014090	-1.145686	-.531486	-.160324	.032134	.110004	.114160
.4	-.093289	-.473730	-1.097416	-1.957968	-2.939832	-1.977916	-1.117984	-.504669	-.129871	.062900	.127900
.5	.083455	-.099126	-.477503	-1.098921	-1.966660	-2.924486	-1.966659	-1.098921	-.477504	-.099125	.083454
.6	.127906	.063791	-.129874	-.504669	-1.117985	-1.977916	-2.939831	-1.957968	-1.097415	-.473721	-.093289
.7	.114161	.109990	.032134	-.160324	-.531485	-1.145686	-2.014090	-2.991580	-2.036828	-1.170771	-.511097
.8	.085498	.105529	.088679	.006541	-.194512	-.587591	-1.242262	-2.168214	-3.205002	-2.269939	-1.300052
.9	.063407	.089865	.098147	.068304	-.042251	-.300228	-.787896	-1.571758	-2.629588	-3.713212	-2.560326
1.0	.055797	.082717	.096517	.079993	-.005212	-.221719	-.651527	-1.371778	-2.393210	-3.538989	-4.243007

TABLO 3.16 a $\alpha L=3.5 \quad \beta L=2.8$

ξ_{yP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.007013	.005060	.003272	.002056	.001111	.000484	.000101	-.000110	-.000212	-.000254	-.000272
.1	.005060	.004542	.003727	.002797	.001942	.001244	.000718	.000344	.000085	-.000101	-.000254
.2	.003272	.003727	.003827	.003424	.002745	.002022	.001375	.000843	.000422	.000085	-.000212
.3	.002056	.002797	.003424	.003706	.003414	.002792	.002086	.001422	.000843	.000344	-.000110
.4	.001111	.001942	.002745	.003414	.003723	.003442	.002815	.002086	.001375	.000718	.000101
.5	.000484	.001244	.002022	.002792	.003442	.003737	.003442	.002792	.002022	.001244	.000484
.6	.000101	.000718	.001375	.002086	.002815	.003442	.003723	.003414	.002745	.001942	.001111
.7	-.000110	.000344	.000843	.001422	.002086	.002792	.003414	.003706	.003424	.002797	.002056
.8	-.000212	.000085	.000423	.000842	.001375	.002022	.002745	.003424	.003827	.003727	.003272
.9	-.000254	-.000101	.000085	.000344	.000718	.001244	.001942	.002797	.003727	.004542	.005060
1.0	-.000272	-.000254	-.000212	-.000110	.000101	.000484	.001111	.002056	.003272	.005060	.007013

$\xi_{\varphi P}$

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.020103	-.018507	-.015084	-.011242	-.007745	-.004925	-.002856	-.001473	-.000651	-.000252	-.000146
.1	-.004520	-.006576	-.009156	-.009135	-.007826	-.006108	-.004444	-.003095	-.002158	-.001636	-.001479
.2	.002886	.002911	-.001436	-.005918	-.007284	-.006970	-.005917	-.004722	-.003729	-.003107	-.002905
.3	.007540	.007105	.005054	-.000059	-.005103	-.006935	-.006992	-.006227	-.005248	-.004595	-.004454
.4	.008314	.008261	.007624	.005396	.000126	-.005068	-.007067	-.007222	-.006850	-.006314	-.006091
.5	.007542	.007687	.007846	.007271	.005241	.000000	-.005241	-.007271	-.007846	-.007687	-.007542
.6	.006091	.006314	.006850	.007222	.007067	.005068	-.000126	-.005396	-.007624	-.008261	-.008314
.7	.004454	.004595	.005247	.006227	.006992	.006935	.005103	.000059	-.005054	-.007105	-.007540
.8	.002905	.003107	.003729	.004722	.005917	.006970	.007284	.005918	.001436	-.002911	-.002886
.9	.001479	.001636	.002158	.003095	.004444	.006108	.007826	.009135	.009156	.006576	.004520
1.0	.000146	.000252	.000651	.001473	.002856	.004925	.007745	.011242	.015084	.018507	.020103

ξ_{MP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.028110	-.038053	-.037540	-.031877	-.024421	-.017084	-.010795	-.005876	-.002322	.000000
.1	.000000	.044647	.010131	-.008368	-.016212	-.017547	-.015226	-.011497	-.007251	-.003280	.000000
.2	.000000	.024047	.065301	.026249	.003360	-.008084	-.011998	-.011349	-.008242	-.004118	.000000
.3	.000000	.010287	.033032	.072418	.021618	.007401	-.004834	-.009001	-.009157	-.004582	.000000
.4	.000000	.002109	.012292	.034682	.073918	.033163	.009235	-.002459	-.005882	-.004220	.000000
.5	.000000	-.002325	.000208	.010979	.034040	.074002	.034040	.010979	.000208	-.002325	.000000
.6	.000000	-.004220	-.005882	-.002459	.009235	.033163	.073918	.034682	.012292	.002109	.000000
.7	.000000	-.004582	-.009157	-.009001	-.004834	.007401	.021618	.072418	.033032	.010287	.000000
.8	.000000	-.004118	-.008242	-.011349	-.011998	-.008084	.003360	.026249	.065301	.024047	.000000
.9	.000000	-.003279	-.007251	-.011497	-.015226	-.017547	-.016212	-.008368	.010131	.044647	.000000
1.0	.000000	-.002322	-.005876	-.010795	-.017084	-.024421	-.031877	-.037540	-.038053	-.028110	.000000

ξ_{VP}

a/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.595758										
	-.404242	-.175231	-.026436	.037925	.065821	.076198	.069064	.056221	.042196	.029130	.017529
.1	.341744	.554314									
		-.445686	-.255205	-.123758	-.040024	.008433	.032781	.041963	.041941	.036830	.028217
.2	.166901	.319987	.511850								
			-.488150	-.301356	-.164376	-.071058	-.012152	.021660	.038126	.042692	.038277
.3	.056172	.158078	.302380	.493073							
				-.506927	-.317067	-.175051	-.076191	-.012226	.025341	.043333	.045940
.4	-.007021	.055083	.155478	.300156	.492424						
					-.507576	-.315442	-.170871	-.059636	-.004118	.033199	.047586
.5	-.037640	-.004096	.050347	.161846	.307144	.500000					
						-.500000	-.307143	-.161846	-.050347	.004096	.037640
.6	-.047586	-.033200	.004118	.059636	.170872	.315442	.507576				
							-.492424	-.300156	-.155478	-.055084	.007021
.7	-.045940	-.043333	-.025341	.012226	.076191	.175051	.317067	.506927			
								-.493073	-.302380	-.158078	-.056172
.8	-.038276	-.042692	-.038126	-.021660	.012152	.071058	.164376	.301356	.488150		
									-.511850	-.319987	-.166901
.9	-.028217	-.036830	-.041940	-.041963	-.032780	-.008423	.040024	.123758	.255205	.445686	
										-.554314	-.341744
1.0	-.017530	-.029130	-.042196	-.056221	-.069064	-.076198	-.069821	-.037925	.026436	.175231	.404242
											-.595758

TABLO 3.16 b $\alpha L=3.5 \quad \beta L=2.8$

ξ_{yM}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.020103	-.004520	.002865	.007540	.008314	.007542	.006091	.004464	.002905	.001479	.000146
.1	-.015507	-.006576	.002811	.007165	.008261	.007627	.006214	.004656	.003107	.001530	.000252
.2	-.015684	-.009156	-.001456	.005054	.007624	.007645	.006550	.005343	.002720	.002156	.000651
.3	-.011243	-.009135	-.005018	-.000059	.005390	.007371	.007322	.006237	.004722	.003055	.001473
.4	-.007745	-.007836	-.007254	-.005102	.000126	.005241	.007057	.006582	.006917	.004444	.002256
.5	-.004925	-.006109	-.006970	-.006925	-.005065	.000000	.005065	.006925	.006970	.006109	.004925
.6	-.002256	-.004444	-.006917	-.006582	-.007057	-.005241	-.000126	.005102	.007254	.007836	.007745
.7	-.001473	-.003055	-.004722	-.006237	-.007322	-.007371	-.005395	.000059	.005018	.009135	.011243
.8	-.000651	-.002156	-.002720	-.005347	-.006550	-.007645	-.007624	-.005054	.001456	.009156	.015684
.9	-.000252	-.001535	-.003107	-.004595	-.006214	-.007597	-.008261	-.007105	-.002811	.006576	.015507
1.0	-.000146	-.001479	-.002905	-.004464	-.006091	-.007542	-.008314	-.007540	-.002865	.004520	.020103

$\xi_{\varphi M}$

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.200946	.115490	.055701	.019486	-.001785	-.012224	-.015882	-.016153	-.014929	-.013028	-.013159
.1	.115490	.127237	.064676	.024456	.000989	-.010924	-.015613	-.016211	-.015227	-.014159	-.013028
.2	.055701	.064676	.092197	.042422	.011679	-.005371	-.013278	-.016041	-.016075	-.015227	-.014929
.3	.019486	.024456	.042422	.070070	.034208	.007615	-.006971	-.012738	-.016041	-.016211	-.016153
.4	-.001785	.000989	.011679	.034208	.073404	.032009	.006798	-.006971	-.013278	-.015613	-.015882
.5	-.012224	-.010924	-.005371	.007615	.032009	.072414	.032009	.007615	-.005371	-.010924	-.012224
.6	-.015882	-.015613	-.013278	-.006971	.006798	.032009	.073404	.034208	.011679	.000989	-.001785
.7	-.016153	-.016211	-.016041	-.012738	-.006971	.007615	.034208	.070070	.042422	.024456	.019486
.8	-.014929	-.015227	-.016075	-.016041	-.013278	-.005371	.011679	.042422	.092197	.064676	.055701
.9	-.013028	-.014159	-.015227	-.016211	-.015613	-.010924	.000989	.024456	.064676	.127237	.115490
1.0	-.013159	-.013028	-.014929	-.016153	-.015882	-.012224	-.001785	.019486	.055701	.115490	.200946

ξ_{MM}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000 1.000000	.713980	.470605	.282251	.150755	.054949	.015255	-.008164	-.014233	-.009707	-.000000
.1	.000000	-.245153 .754837	.504721	.309172	.168932	.076713	.022299	-.004540	-.012677	-.009267	-.000000
.2	.000000	-.168957	-.289267 .710733	.392497	.220539	.110280	.046027	.009727	-.006092	-.007084	.000000
.3	.000000	-.107016	-.250313	-.459918 .540082	.342553	.192552	.100277	.040547	.009528	-.001460	.000000
.4	.000000	-.051145	-.157272	-.300825	-.488754 .511246	.324801	.157424	.094797	.036655	.009872	.000000
.5	.000000	-.025710	-.085750	-.179625	-.316007	-.500000 .500000	.316007	.179625	.085750	.025710	.000000
.6	.000000	-.009872	-.036655	-.094797	-.157424	-.324801	-.511246 .488754	.300825	.157272	.051145	.000000
.7	.000000	.001420	.009528	-.040540	-.100277	-.192552	-.342553	-.540082 .459918	.250313	.107016	.000000
.8	.000000	.007084	.006092	-.009727	-.046027	-.110280	-.220539	-.392497	-.710733 .289267	.168957	.000000
.9	.000000	.009267	.012677	.004540	-.022299	-.076713	-.168932	-.309172	-.504721	-.754837 .245153	.000000
1.0	.000000	.009707	.014233	.008164	-.015255	-.054949	-.150755	-.282251	-.470605	-.713980	-1.000000 .000000

ξ_{VM}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-2.971789	-2.695345	-2.150777	-1.595472	-1.074759	-.559241	-.349725	-.135070	.009335	.075247	.107373
.1	-3.122843	-2.720545	-2.225705	-1.571356	-1.140425	-.715459	-.390987	-.181531	-.012032	.071914	.105517
.2	-1.400058	-1.952220	-2.429145	-1.901704	-1.354294	-.956006	-.526132	-.255515	-.072154	.035794	.090886
.3	-.842540	-1.299344	-1.757675	-2.214581	-1.706216	-1.204201	-.774142	-.435589	-.150370	-.020144	.054675
.4	-.446371	-.755191	-1.199192	-1.646333	-2.104712	-1.617400	-1.139192	-.728626	-.409675	-.180124	-.025445
.5	-.185042	-.420494	-.725326	-1.134960	-1.500412	-2.072520	-1.500412	-1.134960	-.725325	-.420492	-.185042
.6	-.025445	-.180125	-.409675	-.728626	-1.136192	-1.617400	-2.104712	-1.646333	-1.199193	-.735193	-.446371
.7	.054675	-.020147	-.150271	-.435589	-.774142	-1.204201	-1.706216	-2.214581	-1.757675	-1.299343	-.842540
.8	.092224	.029785	-.072156	-.255515	-.526132	-.956006	-1.354294	-1.901704	-2.429145	-1.952219	-1.400058
.9	.105515	.071916	-.012034	-.181532	-.390988	-.715457	-1.140420	-1.571356	-2.225705	-2.720544	-3.122843
1.0	.107373	.075250	.009337	-.135169	-.349724	-.559241	-1.074759	-1.595472	-2.150777	-2.695345	-2.971789

TABLO 3.17 a $\alpha L=5.0$ $\beta L=1.7$

ξ_{yP}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.002597	.001892	.001310	.000871	.000560	.000349	.000212	.000125	.000071	.000036	.000010
.1	.001892	.001908	.001648	.001259	.000912	.000624	.000411	.000252	.000151	.000090	.000036
.2	.001310	.001648	.001820	.001634	.001285	.000936	.000648	.000421	.000274	.000151	.000071
.3	.000871	.001259	.001624	.001819	.001629	.001291	.000943	.000653	.000421	.000252	.000125
.4	.000560	.000912	.001285	.001629	.001820	.001638	.001292	.000942	.000648	.000411	.000212
.5	.000349	.000624	.000936	.001291	.001638	.001819	.001638	.001291	.000936	.000624	.000349
.6	.000212	.000411	.000648	.000943	.001292	.001638	.001820	.001638	.001285	.000912	.000560
.7	.000125	.000252	.000421	.000653	.000943	.001291	.001638	.001819	.001634	.001259	.000871
.8	.000071	.000151	.000274	.000431	.000648	.000936	.001285	.001634	.001820	.001648	.001310
.9	.000036	.000090	.000151	.000252	.000411	.000624	.000912	.001259	.001648	.001908	.001892
1.0	.000010	.000036	.000071	.000125	.000212	.000349	.000560	.000871	.001310	.001892	.002597

$\xi_{\varphi P}$

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.007213	-.006498	-.005103	-.003712	-.002562	-.001696	-.001087	-.000681	-.000427	-.000289	-.000244
.1	.000754	-.001134	-.002543	-.002817	-.002259	-.002491	-.001783	-.001225	-.000834	-.000502	-.000522
.2	.002569	.002941	-.000075	-.003077	-.003548	-.003229	-.002523	-.001844	-.001316	-.000982	-.000864
.3	.003988	.003927	.003125	.000012	-.003040	-.003637	-.003236	-.002553	-.001920	-.001483	-.001321
.4	.003459	.003628	.003760	.003060	-.000004	-.003035	-.003635	-.003260	-.002629	-.002130	-.001926
.5	.002672	.002894	.003362	.003562	.003031	.000000	-.003031	-.003562	-.003362	-.002894	-.002672
.6	.001926	.002130	.002629	.003260	.003635	.003035	.000004	-.003060	-.003760	-.003628	-.003459
.7	.001321	.001483	.001920	.002553	.003236	.003637	.003040	-.000012	-.003125	-.003927	-.003988
.8	.000864	.000982	.001316	.001544	.002523	.003229	.003548	.003077	.000075	-.002941	-.003569
.9	.000522	.000501	.000824	.001225	.001782	.002491	.002259	.002817	.002542	.001134	-.000754
1.0	.000244	.000289	.000428	.000681	.001087	.001696	.002562	.002712	.005103	.006498	.007213

ξ_{MP}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000	-.012149	-.014527	-.012899	-.010075	-.007290	-.004985	-.003224	-.001913	-.000898	-.000000
.1	.000000	.041812	.010451	-.002988	-.007293	-.007638	-.006400	-.004737	-.003098	-.001559	-.000000
.2	.000000	.014919	.049981	.014610	-.000875	-.006392	-.007244	-.006144	-.004347	-.002301	-.000000
.3	.000000	.002450	.015245	.050558	.014956	-.000680	-.006305	-.006927	-.005510	-.003110	.000000
.4	.000000	-.002508	.001060	.015533	.050242	.014875	-.000549	-.005796	-.006055	-.003523	.000000
.5	.000000	-.003980	-.004725	-.000052	.015015	.050091	.015016	-.000052	-.004725	-.003980	.000000
.6	.000000	-.003522	-.006055	-.005797	-.000549	.014875	.050242	.015532	.001060	-.002508	.000000
.7	.000000	-.003111	-.005510	-.006927	-.006305	-.000680	.014956	.050558	.015245	.002450	.000000
.8	.000000	-.002302	-.004346	-.006144	-.007244	-.006392	-.000875	.014610	.049981	.014919	.000000
.9	.000000	-.001551	-.003098	-.004737	-.006401	-.007638	-.007293	-.002988	.010451	.041812	.000000
1.0	.000000	-.000897	-.001912	-.003222	-.004984	-.007290	-.010075	-.012899	-.014527	-.012149	.000000

ξ_{VP}

z/l	x/l .0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.798745										
	-.201255	-.059584	.002805	.025292	.029254	.025774	.020259	.015132	.011350	.009250	.009302
.1	.317109	.550022									
		-.449978	-.203500	-.077946	-.018080	.007224	.015693	.016875	.015807	.015152	.016503
.2	.085227	.228446	.498654								
			-.501346	-.222250	-.092215	-.025651	.004265	.015757	.019497	.021435	.025122
.3	-.014819	.070733	.220018	.493981							
				-.506019	-.234685	-.092957	-.025072	.006383	.020122	.027470	.025262
.4	-.045164	.000460	.079564	.225044	.496945						
					-.503055	-.232563	-.091692	-.021597	.012435	.030801	.045899
.5	-.052434	-.025552	.014122	.087331	.229552	.500000					
						-.500000	-.229552	-.087331	-.014122	.025552	.052432
.6	-.045901	-.030799	-.012435	.021597	.091692	.232563	.503055				
							-.496945	-.225044	-.079564	-.000459	.045162
.7	-.025262	-.027467	-.020122	-.006382	.025072	.092968	.234685	.506020			
								-.493980	-.220019	-.070733	.014818
.8	-.025122	-.021432	-.019497	-.015757	-.004265	.025651	.092215	.222251	.501346		
									-.498654	-.228446	-.085229
.9	-.016503	-.015155	-.015806	-.016875	-.015693	-.007223	.018080	.077947	.203500	.449978	
										-.550022	-.317109
1.0	-.009302	-.009252	-.011352	-.015133	-.020260	-.025774	-.029254	-.025292	-.002805	.059584	.201255
											-.798745

TABLO 3.17 b

$\alpha L=5.0 \quad \beta L=1.7$

ξ_{yM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-.007213	.000764	.002569	.002998	.003459	.002672	.001926	.001321	.000864	.000522	.000344
.1	-.005489	-.001134	.002941	.002937	.003539	.002894	.002130	.001483	.000922	.000502	.000289
.2	-.005103	-.003543	-.000075	.003125	.002769	.003362	.002639	.001920	.001316	.000934	.000427
.3	-.003712	-.003817	-.003077	.000012	.003060	.003662	.003260	.002553	.001844	.001225	.000681
.4	-.002563	-.003259	-.003649	-.003040	-.000004	.003031	.003635	.003236	.002523	.001753	.001097
.5	-.001596	-.002491	-.003229	-.003637	-.003035	.000000	.003035	.003637	.003229	.002491	.001596
.6	-.001097	-.001753	-.002523	-.003236	-.003635	-.003031	.000004	.003040	.003649	.003259	.002563
.7	-.000681	-.001225	-.001844	-.002553	-.003260	-.003662	-.003060	-.000012	.003077	.003817	.003712
.8	-.000428	-.000824	-.001316	-.001920	-.002639	-.003362	-.002769	-.003125	.000075	.003543	.005103
.9	-.000289	-.000501	-.000922	-.001483	-.002130	-.002894	-.003628	-.003937	-.002941	.001124	.005489
1.0	-.000244	-.000522	-.000864	-.001321	-.001926	-.002672	-.003459	-.002998	-.002569	-.000764	.007213

$\xi_{\varphi M}$

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.120127	.047717	.012860	-.002171	-.007318	-.007948	-.006822	-.005279	-.003920	-.003004	-.002569
.1	.047717	.055603	.021351	.001402	-.006159	-.007888	-.007174	-.005727	-.004338	-.003365	-.003003
.2	.012860	.021351	.052055	.015814	-.000526	-.006442	-.007523	-.006687	-.005389	-.004337	-.003920
.3	-.002171	.001402	.015814	.050455	.014985	-.000628	-.005293	-.007362	-.006687	-.005725	-.005279
.4	-.007318	-.006159	-.000526	.014985	.050177	.014954	-.000595	-.006293	-.007523	-.007174	-.006822
.5	-.007948	-.007888	-.006442	-.000628	.014954	.050180	.014954	-.000628	-.006442	-.007888	-.007948
.6	-.006822	-.007174	-.007523	-.006293	-.000595	.014954	.050177	.014985	-.000526	-.006159	-.007318
.7	-.005279	-.005727	-.006687	-.007364	-.006293	-.000628	.014985	.050455	.015814	.001402	-.002171
.8	-.003920	-.004338	-.005389	-.006687	-.007523	-.006442	-.000526	.015814	.052055	.021351	.012860
.9	-.003003	-.003366	-.004338	-.005727	-.007174	-.007888	-.006159	.001402	.021351	.055603	.047717
1.0	-.002567	-.003003	-.003920	-.005279	-.006822	-.007948	-.007318	-.002171	.012860	.047717	.120127

ξ_{MM}

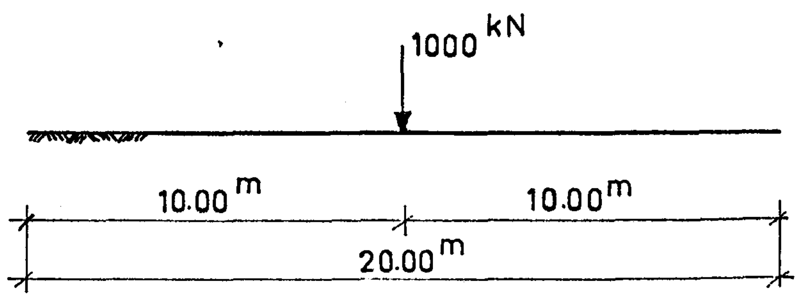
a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	.000000 1.000000	.499169	.227703	.088962	.022615	-.005603	-.014794	-.015131	-.011651	-.006459	.000000
.1	.000000	-.375935 .624065	.295057	.122195	.038751	.001107	-.012684	-.015025	-.012193	-.005957	.000000
.2	.000000	-.181708	-.474144 .525856	.244504	.099898	.028407	-.002114	-.012399	-.012553	-.007857	.000000
.3	.000000	-.078965	-.224424	-.496157 .503843	.233939	.094478	.027269	-.001215	-.009891	-.008057	.000000
.4	.000000	-.027581	-.002920	-.222151	-.499854 .500146	.222482	.094270	.026243	.000992	-.005462	.000000
.5	.000000	-.003935	-.029748	-.095061	-.232691	-.500000 .500000	.232691	.095061	.029748	.003935	.000000
.6	.000000	.005460	-.000991	-.026243	-.094359	-.222482	-.500146 .499854	.222152	.093921	.027581	.000000
.7	.000000	.008063	.009890	.001313	-.027269	-.094478	-.233939	-.503843 .496157	.224424	.078965	.000000
.8	.000000	.007863	.012553	.012399	.002114	-.028407	-.099897	-.244504	-.525856 .474144	.181708	.000000
.9	.000000	.005952	.012195	.015026	.012684	-.001107	-.038751	-.122195	-.295057	-.624065 .375935	.000000
1.0	.000000	.005471	.011654	.015133	.014795	.005604	-.022615	-.088962	-.227702	-.499169	-1.000000 .000000

ξ_{VM}

a/l \ x/l	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
.0	-6.650208	-2.651978	-1.919703	-.951499	-.430943	-.154245	-.035919	.021130	.045141	.057934	.072590
.1	-3.313396	-4.412235	-2.356685	-1.194245	-.560364	-.229576	-.066208	.009350	.042920	.060871	.079265
.2	-1.515115	-2.232296	-3.786258	-2.005939	-1.004749	-.462013	-.180108	-.040322	.027297	.063742	.094079
.3	-.592717	-1.045966	-1.960408	-3.632816	-1.923059	-.960752	-.437913	-.163810	-.023159	.053063	.107107
.4	-.151457	-.429259	-.951121	-1.907094	-3.604200	-1.906329	-.949489	-.426695	-.147520	.004224	.100041
.5	.026658	-.139677	-.416024	-.943411	-1.902429	-3.600615	-1.902429	-.943411	-.416022	-.139679	.026962
.6	.100032	.004225	-.147520	-.426693	-.949491	-1.906329	-3.604200	-1.907094	-.951119	-.429253	-.151451
.7	.107101	.053076	-.023156	-.163805	-.437912	-.960751	-1.923058	-3.632815	-1.960405	-1.045965	-.592712
.8	.094045	.063753	.027295	-.040322	-.180110	-.462013	-1.004749	-2.005939	-3.786257	-2.232297	-1.515115
.9	.079234	.060888	.042919	.009339	-.066313	-.229577	-.560366	-1.194246	-2.356695	-4.412235	-3.313394
1.0	.072567	.057922	.045133	.021125	-.035922	-.154247	-.430945	-.951500	-1.919703	-2.651978	-6.650208

3.6.4 Sayısal Ornekler

Örnek 1: Kesit özellikleri; EI=1.89E7 kNm², δ=1.7 m, L=20 m olan Şekil 2.* deki kirişin (1) ve (2) noktalarındaki çökme, dönme, moment ve kesme kuvveti bulunacaktır. Zeminin 1. parametresi k=50405 kN/m², 2. parametresi t=212925 kN olarak alınmıştır.



Şekil 3.6 Örnek 1

$s^2=5.164E-2$ $r^2=1.127E-2$

$\alpha=0.177$ $\alpha L=3.5$

$\beta=0.142$ $\beta L=2.8$

αL ve βL için ilgili tablodan aşağıdaki değerler bulunmuştur. (1) noktasında;

a/L=0.5 , x/L=0.0 için $\xi_{yP}=0.000484$, $\xi_{\varphi P}=0.007542$,

$\xi_{MP}=0.0$, $\xi_{VP}=-0.03764$

$$y_1=\frac{PL^3}{EI}\xi_{yP}=\frac{1000*20^3}{1.89*10^7}*0.000484=2.05*10^{-4}\ m$$

$$\varphi_1=\frac{PL^2}{EI}\xi_{\varphi P}=\frac{1000*20^2}{1.89*10^7}*0.007542=1.60*10^{-4}$$

$$M_1=PL\,\xi_{MP}=0.00$$

$$V_1=P\,\xi_{VP}=1000*(-0.03764)=-37.64\ kN$$

(2) noktasında;

a/L=0.5 , x/L=0.5 için ξ_{yP} =0.003737, $\xi_{\varphi P}$ =0.0 ,

ξ_{MP} =0.007402, ξ_{VP} = 0.50, ξ_{VP} = -0.50

$$y_2 = \frac{PL^3}{EI}\xi_{yP} = \frac{1000*20^3}{1.89*10^7}*0.003737 = 1.58*10^{-3}\ m$$

$$\varphi_2 = \frac{PL^2}{EI}\xi_{\varphi P} = 0.00$$

$$M_2 = PL\,\xi_{MP} = 1000*.007402 = 7.4\ kN.m$$

$$V_2 = P\,\xi_{VP} = 1000*0.5 = 500\ kN$$

$$V_2 = P\,\xi_{VP} = 1000*(-0.5) = -500\ kN$$

Örnek 2: Kesit özellikleri EI=0.2E6 kN/m², L=10 m, δ=1.5 m olan Sekil 2.* deki kiristeki moment ve kesme kuvvetleri zeminin bir ve iki parametreli olması durumlarında karşıtırılmıştır. Zeminin 1.parametresi k=16080 kN/m², 2.parametresi t=44630 kN olarak alınmıştır.

Zeminin iki parametreli kabul edilmesi durumunda;

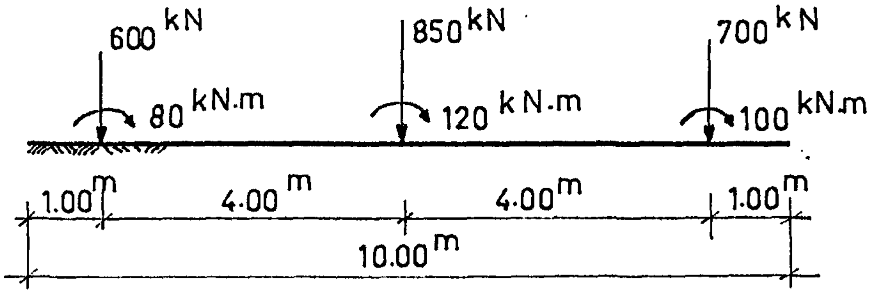
s^2=0.28355 r^2=0.22315

α=0.50 αL=5.0

ß=0.17 ßL=1.7

Zeminin tek parametreli kabul edilmesi durumunda;

λ=0.38 λL=3.8



Şekil 3.2 Örnek 2

TABLO 3.19 c İki parametreli zeminde kiriş kesme kuvvetleri

x/L	Tekil Kuvvet (kN) L=10			Tekil Moment (kN.m) 1			V
	600 a/L=0.1	850 a/L=0.5	700 a/L=0.9	80 a/L=0.1	120 a/L=0.5	100 a/L=0.9	(kN)
0.0	0.317109	-0.053434	-0.016503	-3.313396	0.036858	0.079234	107.3
0.1 (sol)	0.550022	-0.025552	-0.015155	-4.412235	-0.128677	0.060888	260.9
0.1 (sağ)	-0.449978	-0.025552	-0.015155	-4.412235	-0.128677	0.060888	-339.1
0.2	-0.203600	0.014132	-0,015806	-2.336685	-0.416024	0.042912	-144.6
0.3	-0.077846	0.087331	-0.016875	-1.194245	-0.943411	0.009339	-5.1
0.4	-0.018080	0.229552	-0.015693	-0.560364	-1.902429	-0.066212	145.3
0.5 (sol)	0.007274	0.500000	-0.007223	-0.229576	-3.600816	-0.229577	376.9
0.5 (sağ)	0.007224	-0.500000	-0.007223	-0.229576	-3.600816	-0.229577	-473.1
0.6	0.015693	-0.229552	0.018080	-0.066208	-1.902429	-0.560366	-202.0
0.7	0.016875	-0.087331	0.077847	0.009350	0.943411	-1.194246	-32.8
0.8	0.015807	-0.014132	0.203600	0.042920	-0.416022	-2.356685	111.8
0.9 (sol)	0.015163	0.025552	0.449978	0.060871	-0.128679	-4.412235	300.6
0.9 (sağ)	0.015163	0.025552	-0.550022	0.060871	-0.128679	-4.412235	-399.4
1.0	0.016503	0.053434	-0.317109	0.079285	0.036862	-3.313394	-198.7

TABLO 3.19 d Tek parametreli zeminde kiriş kesme kuvvetleri

x/L	Tekil Kuvvet L=1			Tekil Moment (-1/L)=-0.1			V
	600 a/L=0.1	850 a/L=0.5	700 a/L=0.9	80 a/L=0.1	120 a/L=0.5	100 a/L=0.9	(kN)
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.1 (sol)	0.427501	-0.010112	-0.022855	1.869480	0.326646	-0.08697	213.9
0.1 (sağ)	-0.572499	-0.010112	-0.022855	1.869480	0.326646	-0.08697	-386.1
0.2	-0.260784	0.037204	-0.047227	2.434486	0.752488	-0.03196	-186.1
0.3	-0.063023	0.142403	-0.070718	2.208600	1.242455	0.172606	-0.6
0.4	0.042481	0.302031	-0.087005	1.652325	1.697816	0.534908	182.4
0.5 (sol)	0.083963	0.500000	-0.083963	1.046520	1.916679	1.046520	374.8
0.5 (sağ)	0.083963	-0.500000	-0.083963	1.046520	1.916679	1.046520	-475.2
0.6	0.087005	-0.302031	-0.042481	0.534908	1.697816	1.652325	-275.4
0.7	0.070718	-0.142403	0.063023	0.172606	1.242455	2.208600	-72.9
0.8	0.047227	-0.037204	0.260784	-0.03196	0.752488	2.434486	146.1
0.9 (sol)	0.022855	0.010112	0.572499	-0.08697	0.326646	1.869480	401.1
0.9 (sağ)	0.022855	0.010112	-0.427501	-0.08697	0.326646	1.869480	-298.9
1.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

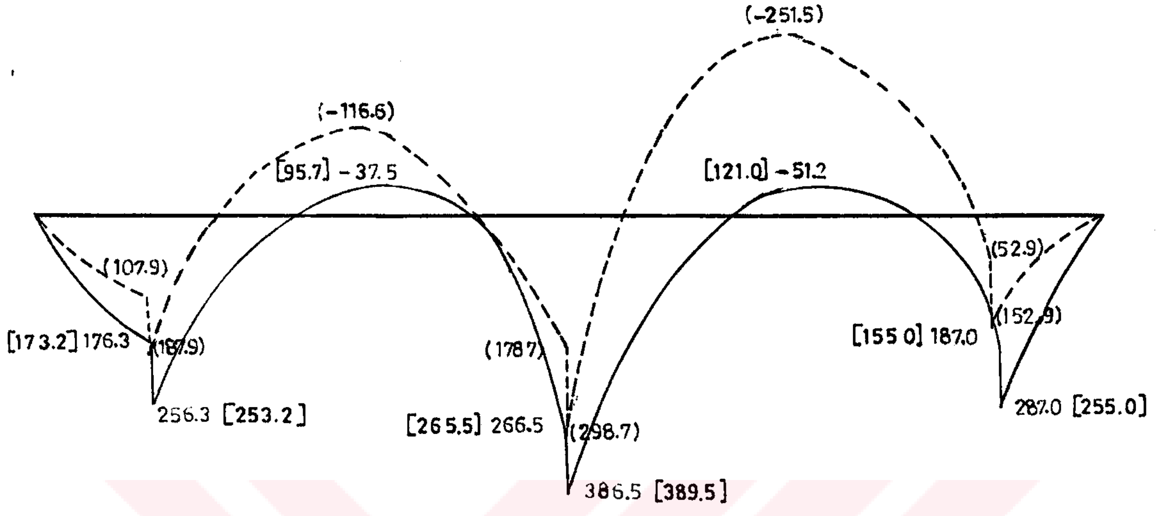
TABLO 3.19 a İki parametreli zeminde kiriş momentleri

x/L	Tekil Kuvvet (kN) L=10			Tekil Moment (kN.m) 1			
	600 a/L=0.1	850 a/L=0.5	700 a/L=0.9	80 a/L=0.1	120 a/L=0.5	100 a/L=0.9	M (kN.m)
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.1 (sol)	0.041812	-0.003980	-0.001561	-0.375935	-0.003935	0.006952	176.3
0.1 (sağ)	0.041812	-0.003980	-0.001561	0.624065	-0.003935	0.006952	256.3
0.2	0.010451	-0.004725	-0.003098	0.295067	-0.029748	0.012195	22.1
0.3	-0.002888	-0.000052	-0.004737	0.123186	-0.095061	0.150260	-37.5
0.4	-0.007293	0.015016	-0.006401	0.038751	-0.232691	0.012684	15.5
0.5 (sol)	-0.007638	0.050091	-0.007638	0.001107	-0.500000	-0.001107	266.5
0.5 (sağ)	-0.007638	0.050091	-0.007638	0.001107	0.500000	-0.001107	386.5
0.6	-0.006400	0.015016	-0.007293	-0.012684	0.232691	-0.038751	61.2
0.7	-0.004737	-0.000052	-0.002888	-0.015025	0.095061	-0.123186	-51.2
0.8	-0.003098	0.004725	0.010451	0.012193	0.029748	-0.295067	12.5
0.9 (sol)	-0.001559	-0.003980	0.041812	-0.006957	0.003935	-0.624065	187.0
0.9 (sağ)	-0.001559	-0.003980	0.041812	-0.006957	0.003935	0.375935	287.0
1.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

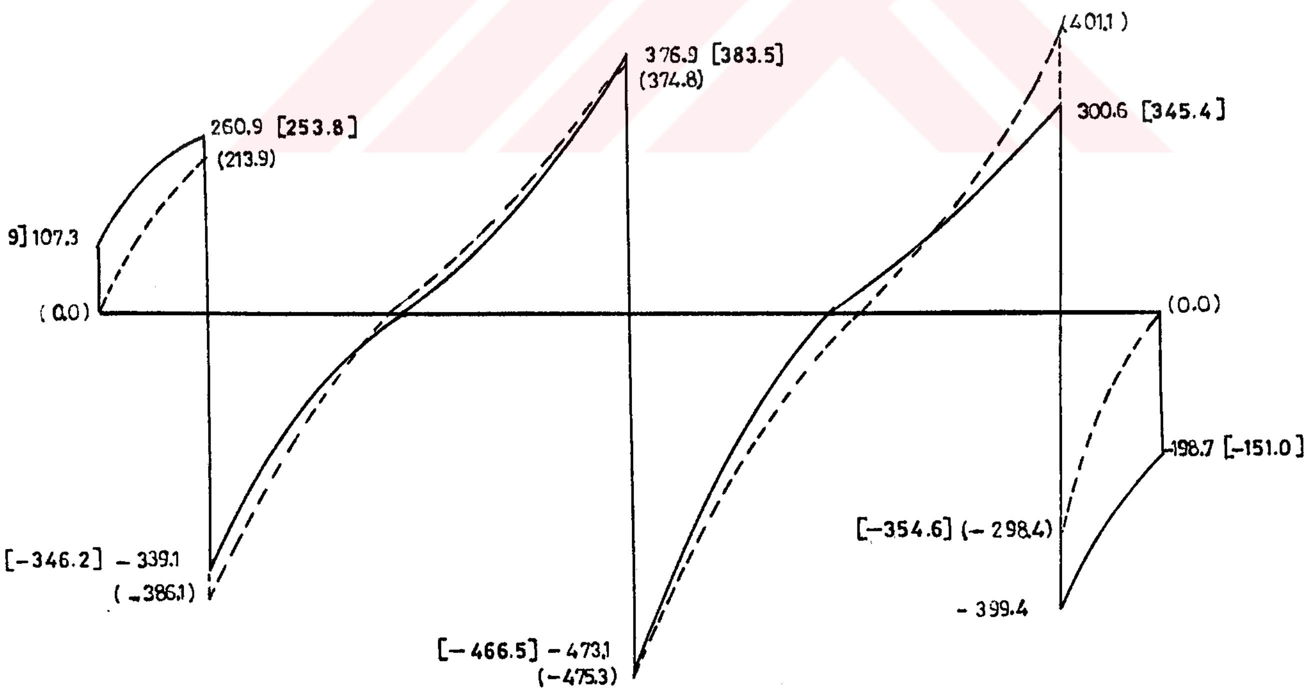
TABLO 3.19 b Tek parametreli zeminde kiriş momentleri

x/L	Tekil Kuvvet L=10			Tekil Moment -1			
	60 a/L=0.1	850 a/L=0.5	700 a/L=0.9	80 a/L=0.1	120 a/L=0.5	100 a/L=0.9	M (kN.m)
0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.1 (sol)	0.022302	-0.000982	-0.001127	0.105194	0.015459	-0.00551	107.9
0.1 (sağ)	0.022302	-0.000982	-0.001127	-0.894806	0.015459	-0.00551	187.9
0.2	-0.018367	-0.000109	-0.004624	-0.670578	0.068666	-0.01266	-96.8
0.3	-0.033678	0.008392	-0.010547	-0.434050	0.168164	-0.00692	-116.6
0.4	-0.034053	0.030200	-0.018534	-0.239667	0.316119	0.027126	-98.8
0.5 (sol)	-0.027312	0.070105	-0.027312	-0.105083	0.500000	0.105083	178.7
0.5 (sağ)	-0.027312	0.070105	-0.027312	-0.105083	-0.500000	0.105083	298.7
0.6	-0.018534	0.030200	-0.034053	-0.027126	-0.316119	0.239667	-81.1
0.7	-0.010547	0.008392	-0.033678	0.006926	-0.168164	0.434050	-251.5
0.8	-0.004624	-0.000109	-0.018367	0.012669	-0.068666	0.670578	-217.1
0.9 (sol)	-0.001127	-0.000982	0.022302	0.005516	-0.015459	0.894806	52.9
0.9 (sağ)	-0.001127	-0.000982	0.022302	0.005516	-0.015459	-0.10519	152.9
1.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Moment Diyagramı



Kesme Kuvveti Diyagramı



———————— İKİ PARAMETRELİ ZEMİN OLMASI DURUMU t=16080 [t= 1608]

- - - - - - - - - - (TEK " " " ")

ŞEKİL 3.8 Kiris moment ve kesme kuvvetleri

BÖLÜM 4

SONUÇLAR

Bu çalışmada iki parametreli elastik zemine oturan sonlu kiriş elemanın statik, dinamik ve burkulma hesabında kullanılabilen genel bir rijitlik matrisi elde edilmiştir.

Dinamik rijitlik matrisinde çubuk kütlesine ek olarak zemin kütlesi de dikkate alınabilmektedir. Bulunan rijitlik matrisi, bir alt program olarak programlanıp, genel bir çerçeve programının içine rahatlıkla konulabilir.

Yine bu çalısmada, iki parametreli elastik zemine oturan sonlu kiriş tesir fonksiyonları bulunmuştur. Başlangıç parametreleri sınır sartlarından çıkarılmıştır.

Zemin parametrelerine bağlı olarak sonlu kiriş tesir çizgisi tabloları bilgisayar programı yardımıyla yapılmıştır. Tablolardan elde edilen sonuçlar, 1. bölümdeki rijitlik matrisini içeren bilgisayar programından elde edilen sonuçlarla karşılaştırılmış, her iki yolla bulunan sonuçların aynı oldugu görülmüştür.

Bu tablolar sayesinde iki parametreli zeminlere oturan temel kirişlerin hesabı kolaylıkla yapılabilmektedir.

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ÖZGEÇMİŞ

4.7.1970 tarihinde İzmit'te doğdu. İlk ve orta ögrenimini aynı yerde tamamlayarak 1987 yılında İzmit Lisesinden mezun oldu. Aynı yıl İTÜ İnşaat Fakültesi İnsaat Mühendiliği bölümüne girdi. Bu fakülteden 1991 yılında mezun oldu. Bir yıl Yesa A.Ş. de proje mühendisi olarak görev yaptı. 1992 yılında İTÜ Fen Bilimleri Enstitüsü İnşaat Ana Bilimdalı Yapı Mühendisligi bölümünde yüksek lisans ögrenimine başladı. Halen Koca Prefabrik Ltd.Şti. de proje ve imalat mühendisi olarak görev yapmaktadır.