

Curve Fit Coefficients for Figure 1A – Original

$Y = (a + c\beta + e\beta^2 + g\beta^3 + i\beta^4) / (1 + b\beta + d\beta^2 + f\beta^3 + h\beta^4 + j\beta^5)$					
Coefficients	Shell parameter, γ				
	5	15	50	100	300
<i>a</i>	1.1311378E-01	1.0677056E-01	1.0109777E-01	1.0421625E-01	1.2660191E-01
<i>b</i>	-5.2677559E+00	-1.1320276E+01	-1.0861214E+01	2.1824726E+01	-4.8528815E+00
<i>c</i>	-7.0077182E-01	-1.2290783E+00	-8.4941998E-01	2.3302278E+00	-1.7577414E+00
<i>d</i>	3.2197618E+01	5.9054782E+01	1.0664988E+02	-1.6411424E+02	-6.7041827E+01
<i>e</i>	5.0076344E+00	6.6407963E+00	6.1027621E+00	-2.1699992E+01	8.5907696E+00
<i>f</i>	-2.3996888E+02	-1.3037717E+02	-4.6751771E+02	1.0772743E+03	7.3516096E+02
<i>g</i>	-3.7157352E+01	-1.7172105E+01	-2.5271049E+01	1.0323029E+02	-8.2197833E+00
<i>h</i>	4.3474384E+02	5.8538852E+01	7.3427013E+02	-7.3712912E+02	-1.3310126E+03
<i>i</i>	9.1224960E+01	1.8233380E+01	4.0443213E+01	-1.0533724E+02	6.8451216E+00
<i>j</i>	6.3719594E+02	1.4923048E+02	0	-5.9351978E+02	9.2624773E+02

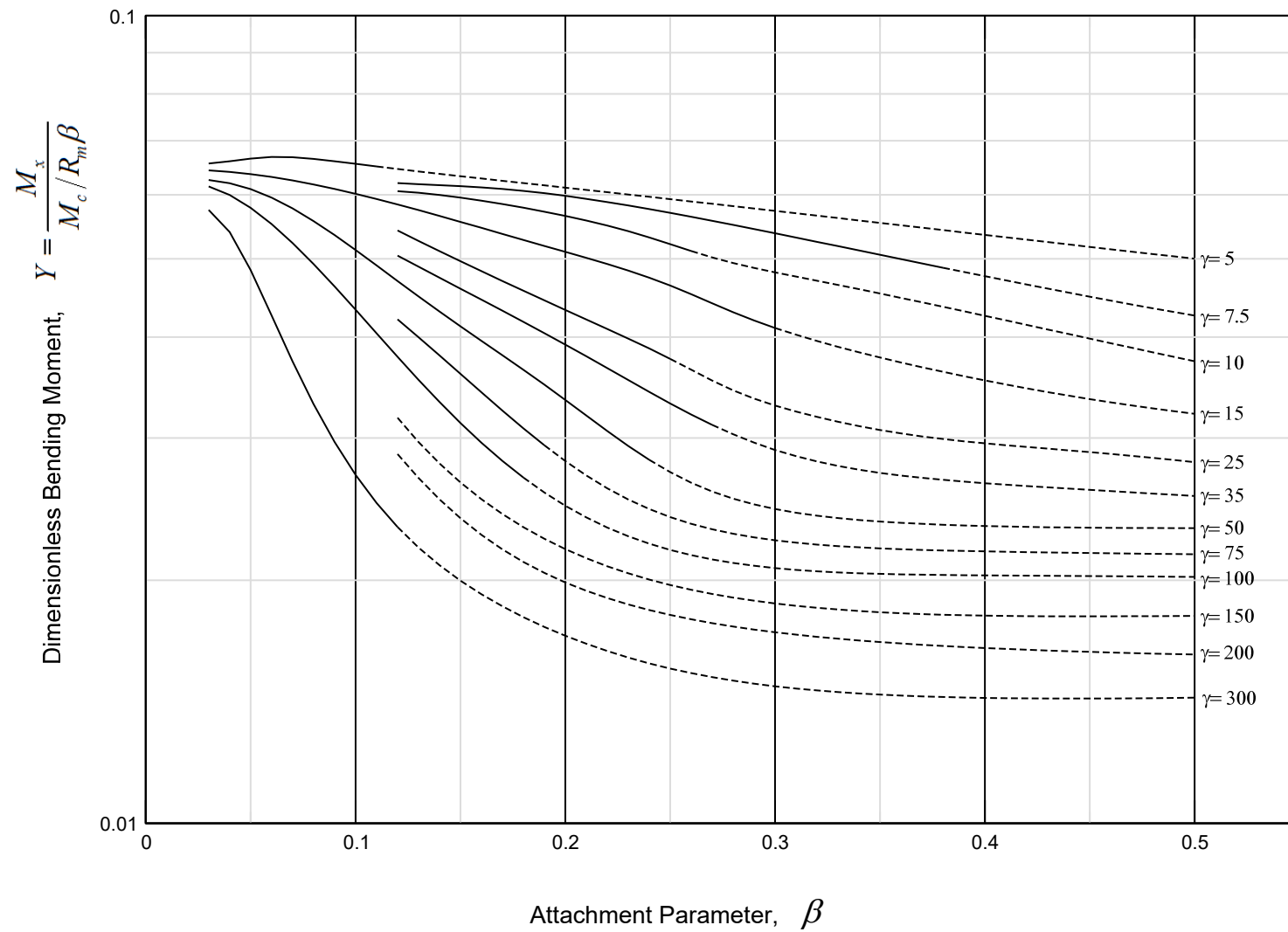


Figure 2A – Moment $\frac{M_x}{(M_c / R_m \beta)}$ Due to an External Circumferential Moment M_c on a Circular Cylinder – *Original*

Curve Fit Coefficients for Figure 2A – Original

Shell Parameter γ	$Y = (a + c\beta + e\beta^2 + g\beta^3 + i\beta^4) / (1 + b\beta + d\beta^2 + f\beta^3 + h\beta^4 + j\beta^5)$									
	Coefficients									
	a	b	c	d	e	f	g	h	i	j
5	6.5550596E-02	-2.5993561E+01	-1.7174177E+00	2.5243438E+02	1.7115228E+01	9.8640306E+01	4.4305416E+00	2.4944027E+02	-8.5471064E+00	-2.8610241E+02
7.5	6.9998542E-02	-1.1398202E+01	-8.6964398E-01	5.5961524E+01	4.5358292E+00	-4.0254339E+01	-4.1243914E+00	1.1489190E+02	1.7618207E+00	-9.2402957E+01
10	-2.5298771E-02	6.0738065E+01	5.8514122E+00	-3.5373388E+02	-3.9477829E+01	1.3300911E+02	5.8939728E+01	5.6680649E+02	4.1894042E+01	2.7465928E+03
15	6.4212033E-02	-6.3640708E+00	-3.7856637E-01	2.0806090E+01	2.2987502E-01	-1.0257479E+02	1.2123817E+00	2.9358399E+02	2.4623819E-01	-1.7458349E+02
25	8.1491183E-02	-8.0001589E+00	-9.7627470E-01	8.1245859E+00	4.4413698E+00	9.1830793E+01	-9.1858885E+00	-3.1899940E+02	7.4273446E+00	3.2416422E+02
35	7.5806271E-02	-6.0734301E+00	-7.3627043E-01	1.0537847E+01	3.1528397E+00	2.0094036E+01	-7.0920728E+00	-1.1426500E+02	7.7476654E+00	2.4684290E+02
50	6.1467002E-02	-1.3015918E+01	-7.0181437E-01	1.2002158E+02	4.4332962E+00	-5.8646181E+02	-1.6621060E+01	1.1391130E+03	2.8449407E+01	0.0000000E+00
75	1.1125820E-01	1.7346099E+01	-2.5343294E-01	-1.6640866E+02	-2.0265568E+00	5.7878480E+02	1.1139333E+01	0.0000000E+00	0.0000000E+00	0.0000000E+00
100	6.0013562E-02	3.5121279E-01	2.4308435E-01	7.5775255E+01	-1.4817605E+00	-1.2367900E+02	5.8442352E+00	1.0598194E+03	1.4243450E+01	1.0663580E+00
150	1.0265936E+00	2.2014737E+02	-1.2663143E+00	6.0008165E+02	1.7990890E+01	-5.0275086E+02	-7.6653789E+00	3.1110158E+02	0.0000000E+00	0.0000000E+00
200	4.1203127E-02	-1.3457287E+01	-2.9125923E-01	1.5288652E+02	2.5352532E+00	-1.2805926E+02	-2.1009296E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
300	4.7266294E-02	-2.5032673E+01	-5.3506994E-01	5.2056401E+02	7.3115462E+00	-3.0751231E+03	-3.8555206E+01	7.7621240E+03	9.2368461E+01	-1.2913989E+03

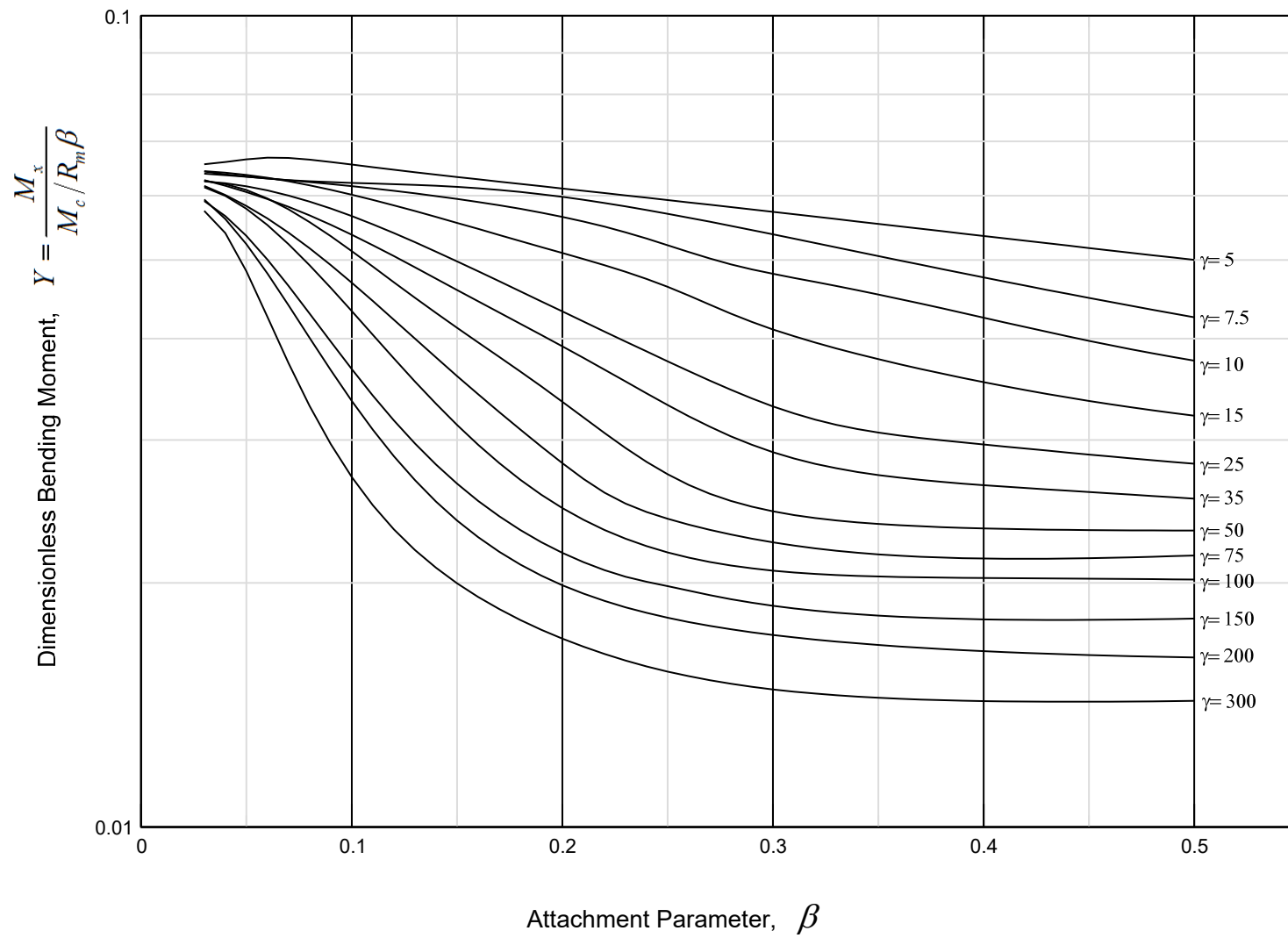


Figure 2A – Moment $\frac{M_x}{(M_c / R_m \beta)}$ Due to an External Circumferential Moment M_c on a Circular Cylinder – *Extrapolated*

Curve Fit Coefficients for Figure 2A – Extrapolated

Shell Parameter γ	$Y = (a + c\beta + e\beta^2 + g\beta^3 + i\beta^4) / (1 + b\beta + d\beta^2 + f\beta^3 + h\beta^4 + j\beta^5)$									
	Coefficients									
	a	b	c	d	e	f	g	h	i	j
5	6.5550596E-02	-2.5993561E+01	-1.7174177E+00	2.5243438E+02	1.7115228E+01	9.8640306E+01	4.4305416E+00	2.4944027E+02	-8.5471064E+00	-2.8610241E+02
7.5	6.6355230E-02	-3.4822641E+00	-3.1473418E-01	1.4295242E+01	1.7109451E+00	4.0741506E+01	0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
10	6.4592671E-02	-9.4873353E+00	-6.3499354E-01	3.3089241E+01	2.2858108E+00	-5.2155868E+01	-3.6186611E+00	3.7371273E+01	2.4193456E+00	3.8058550E+00
15	6.4212033E-02	-6.3640708E+00	-3.7856637E-01	2.0806090E+01	2.2987502E-01	-1.0257479E+02	1.2123817E+00	2.9358398E+02	2.4623819E-01	-1.7458349E+02
25	6.2214927E-02	-6.8130496E+00	-3.8209268E-01	4.0245955E+01	1.1807549E+00	-1.6086325E+02	-3.1080403E+00	2.5903575E+02	4.6778860E+00	-3.9453640E+01
35	6.5185401E-02	-1.2070340E+01	-8.5971268E-01	7.3397847E+01	5.4080322E+00	-1.9063422E+02	-1.6901965E+01	4.2522171E+01	2.2119858E+01	5.7537406E+02
50	6.1467002E-02	-1.3015918E+01	-7.0181437E-01	1.2002158E+02	4.4332962E+00	-5.8646181E+02	-1.6621060E+01	1.1391130E+03	2.8449407E+01	0.0000000E+00
75	6.4732277E-02	-1.2254741E+01	-8.5096148E-01	8.3755582E+01	4.7296908E+00	-3.6637341E+02	-1.4159816E+01	6.8672859E+02	1.9646366E+01	0.0000000E+00
100	6.0013562E-02	3.5121279E-01	2.4308435E-01	7.5775255E+01	-1.4817605E+00	-1.2367900E+02	5.8442352E+00	1.0598194E+03	1.4243450E+01	1.0663580E+00
150	6.0897173E-02	-1.3150436E+01	-7.1738412E-01	1.6561737E+02	4.7100404E+00	-9.7162645E+02	-1.8861283E+01	1.9188875E+03	3.0812124E+01	-3.0480812E+02
200	6.2301148E-02	-9.8009991E+00	-5.2885216E-01	1.6255900E+02	3.9587716E+00	-5.9956263E+02	-1.1633589E+01	1.3707665E+03	2.2751084E+01	-2.5655645E+01
300	4.7266294E-02	-2.5032673E+01	-5.3506994E-01	5.2056401E+02	7.3115462E+00	-3.0751231E+03	-3.8555206E+01	7.7621240E+03	9.2368461E+01	-1.2913989E+03

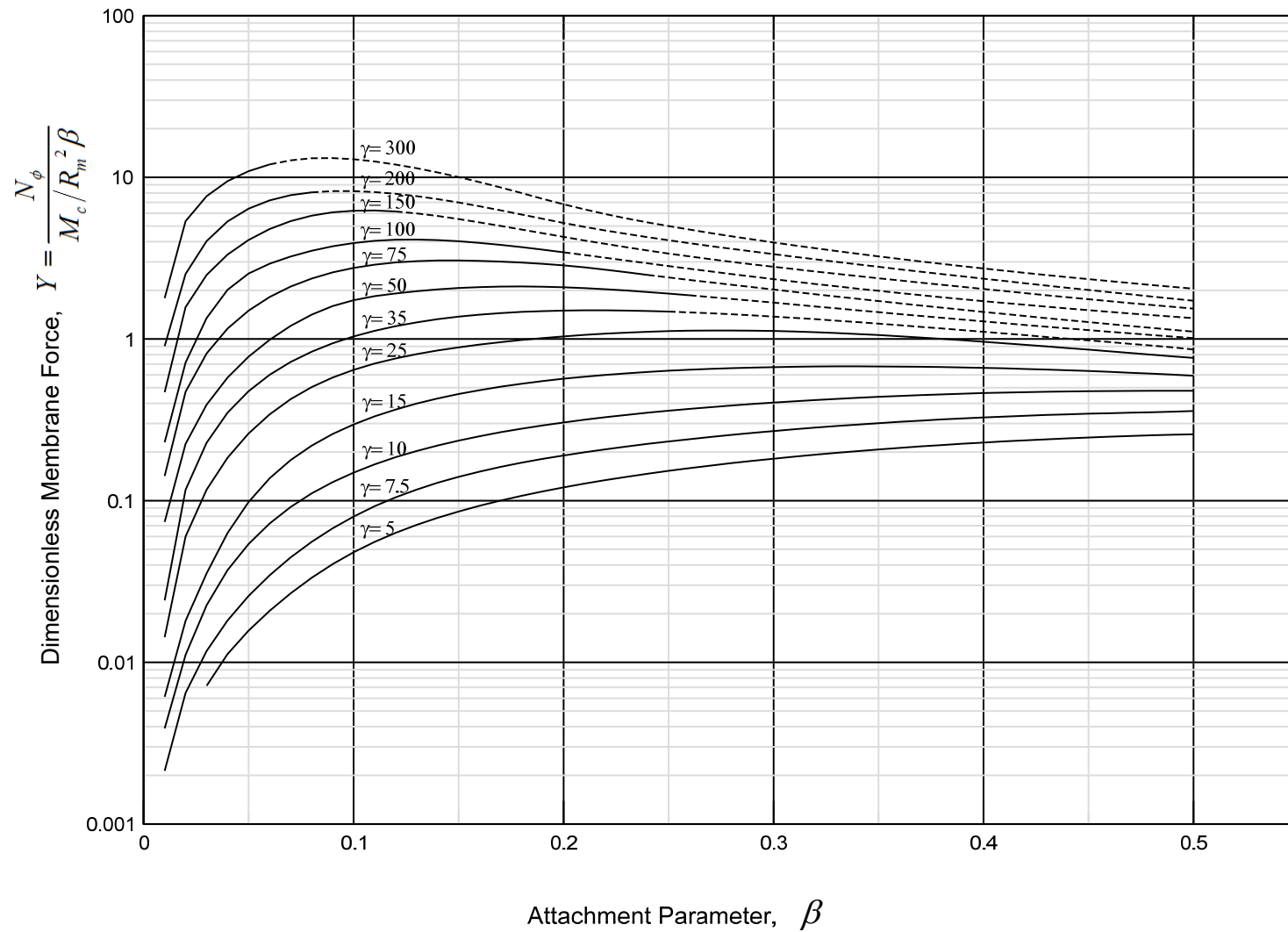


Figure 3A – Membrane Force $\frac{N_\phi}{(M_c / R_m^2 \beta)}$ Due to an External Circumferential Moment M_c on a Circular Cylinder – Original

Curve Fit Coefficients for Figure 3A – Original

Shell Parameter γ	$Y = (a + c\beta + e\beta^2 + g\beta^3 + i\beta^4) / (1 + b\beta + d\beta^2 + f\beta^3 + h\beta^4 + j\beta^5)$									
	Coefficients									
	a	b	c	d	e	f	g	h	i	j
5	-5.6666507E-03	-1.5956787E+01	5.6089337E-01	1.6883125E+02	-1.0083584E+01	-2.7426633E+02	1.0311156E+02	2.9300017E+02	-1.2151112E+02	-2.3768100E+02
7.5	-1.4034405E-03	-1.1983650E+01	3.3601745E-01	9.1093186E+01	-7.7085227E-01	-2.7454432E+02	1.6732661E+01	4.1166827E+02	-3.2078021E+01	-2.8875857E+02
10	1.9773577E-03	1.7264678E+00	-1.0368203E-01	4.4678943E+01	3.1395155E+01	-1.9886103E+02	-9.9073238E+01	2.7242529E+02	9.3845764E+01	-8.0861190E+01
15	-1.4247190E-02	-8.5420866E+00	3.0617913E+00	6.8864517E+02	-1.4050576E+02	2.2470196E+02	3.7326103E+03	3.0559066E+03	-3.8587233E+03	-2.0666500E+03
25	-2.0986951E-02	-1.4029682E+01	3.3468732E+00	1.4379852E+02	-7.5738188E-01	-4.8565847E+02	9.7186567E+01	8.7013941E+02	7.0645338E+01	0.0000000E+00
35	-3.8470292E-02	7.1737944E+00	4.0749583E+00	6.8294905E+01	2.4167260E+02	-2.0576196E+02	-3.9654083E+02	1.1160524E+03	-1.9777460E+02	-2.0840638E+03
50	-5.9144597E-02	-1.9104552E+01	1.3569504E+01	1.2897476E+02	-1.5938220E+02	-1.9732284E+02	9.2937687E+01	-1.3873484E+03	4.8019297E+03	1.1603749E+04
75	-1.6614998E-01	-1.4153200E+01	3.1929366E+01	1.1450185E+02	-3.0278906E+02	-5.5046764E+02	8.2176246E+02	1.0725649E+03	-3.1616487E+02	0.0000000E+00
100	-1.2442458E-01	-4.2161173E+01	3.5546314E+01	8.0573701E+02	-9.3418173E+02	-5.7927203E+03	1.2434072E+04	2.6929228E+04	3.1269177E+03	0.0000000E+00
150	-1.4312119E+00	7.2040118E+01	2.0074450E+02	-1.1370646E+03	1.9710522E+03	1.0846900E+04	-1.5436978E+04	-4.0806009E+04	3.1879118E+04	5.9733283E+04
200	-7.2829938E-01	-1.2253480E+01	1.6942511E+02	1.5600036E+02	-1.6424127E+03	-1.0213406E+03	5.1092927E+03	2.4171535E+03	-2.4259988E+03	1.1441953E+03
300	-1.2359520E+01	2.2486843E+02	1.7639153E+03	-4.4014225E+03	-5.8850377E+02	4.8013492E+04	-1.1033917E+05	-2.6212588E+05	4.0291910E+05	5.5295364E+05

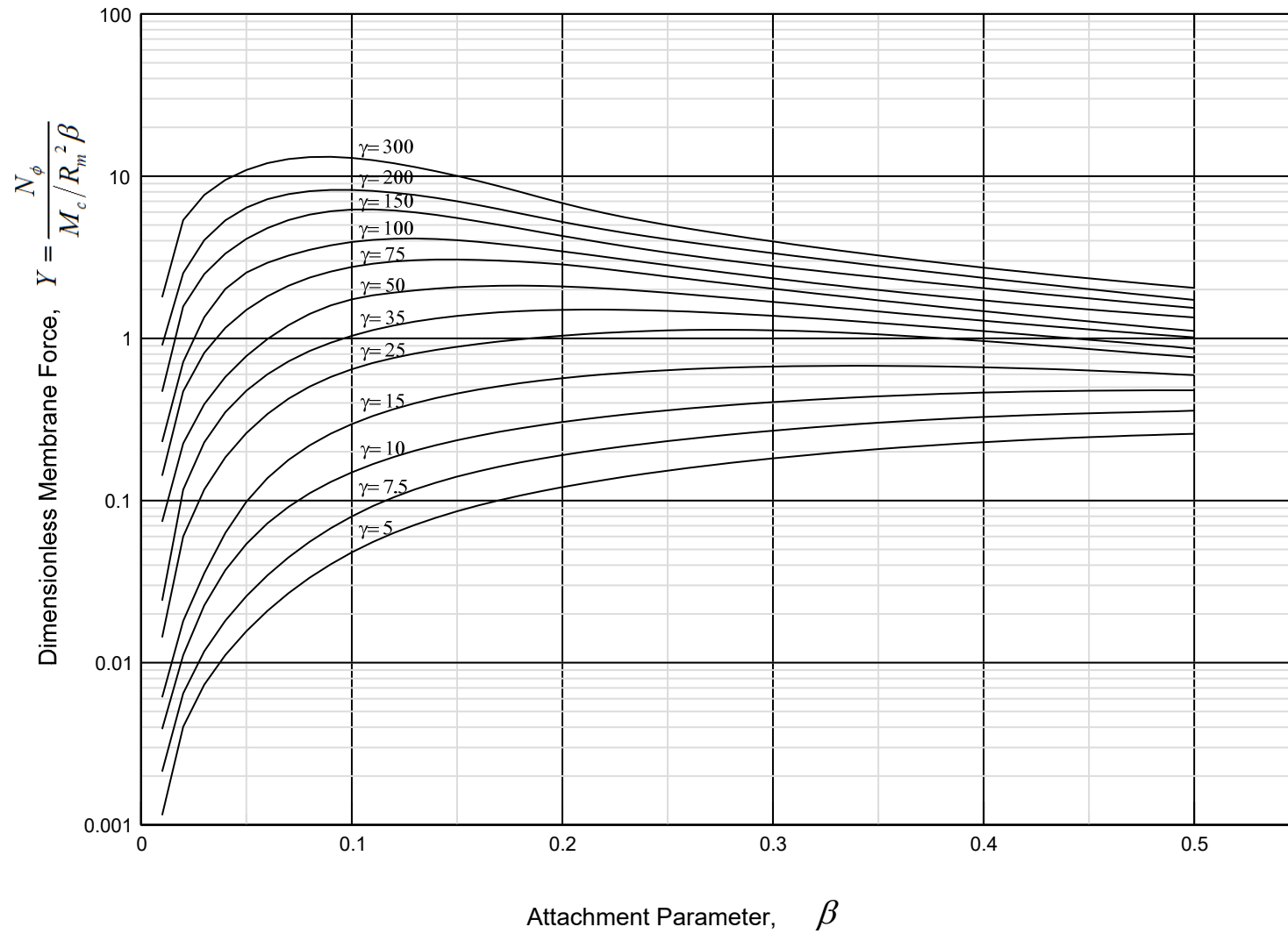


Figure 3A – Moment $\frac{N_\phi}{(M_c / R_m^2 \beta)}$ Due to an External Circumferential Moment M_c on a Circular Cylinder – *Extrapolated*

Curve Fit Coefficients for Figure 3A – Extrapolated

Shell Parameter γ	$Y = (a + c\beta + e\beta^2 + g\beta^3 + i\beta^4) / (1 + b\beta + d\beta^2 + f\beta^3 + h\beta^4 + j\beta^5)$									
	Coefficients									
	a	b	c	d	e	f	g	h	i	j
5	-1.451139E-03	-1.035899E+01	2.650327E-01	9.166767E+01	-1.895453E+00	-1.323582E+02	3.062425E+01	1.812153E+02	0.000000E+00	0.000000E+00
7.5	-1.403441E-03	-1.198365E+01	3.360175E-01	9.109319E+01	-7.708523E-01	-2.745443E+02	1.673266E+01	4.116683E+02	-3.207802E+01	-2.887586E+02
10	1.977358E-03	1.726468E+00	-1.036820E-01	4.467894E+01	3.139516E+01	-1.988610E+02	-9.907324E+01	2.724253E+02	9.384576E+01	-8.086119E+01
15	-1.424719E-02	-8.542087E+00	3.061791E+00	6.886452E+02	-1.405058E+02	2.247020E+02	3.732610E+03	3.055907E+03	-3.858723E+03	-2.066650E+03
25	-2.098695E-02	-1.402968E+01	3.346873E+00	1.437985E+02	-7.573819E-01	-4.856585E+02	9.718657E+01	8.701394E+02	7.064534E+01	0.000000E+00
35	-3.847029E-02	7.173794E+00	4.074958E+00	6.829491E+01	2.416726E+02	-2.057620E+02	-3.965408E+02	1.116052E+03	-1.977746E+02	-2.084064E+03
50	-5.914460E-02	-1.910455E+01	1.356950E+01	1.289748E+02	-1.593822E+02	-1.973228E+02	9.293769E+01	-1.387348E+03	4.801930E+03	1.160375E+04
75	-1.661500E-01	-1.415320E+01	3.192937E+01	1.145019E+02	-3.027891E+02	-5.504676E+02	8.217625E+02	1.072565E+03	-3.161649E+02	0.000000E+00
100	-1.244246E-01	-4.216117E+01	3.554631E+01	8.057370E+02	-9.341817E+02	-5.792720E+03	1.243407E+04	2.692923E+04	3.126918E+03	0.000000E+00
150	-1.431212E+00	7.204012E+01	2.007445E+02	-1.137065E+03	1.971052E+03	1.084690E+04	-1.543698E+04	-4.080601E+04	3.187912E+04	5.973328E+04
200	-7.282994E-01	-1.225348E+01	1.694251E+02	1.560004E+02	-1.642413E+03	-1.021341E+03	5.109293E+03	2.417154E+03	-2.425999E+03	1.144195E+03
300	-1.235952E+01	2.248684E+02	1.763915E+03	-4.401423E+03	-5.885038E+02	4.801349E+04	-1.103392E+05	-2.621259E+05	4.029191E+05	5.529536E+05

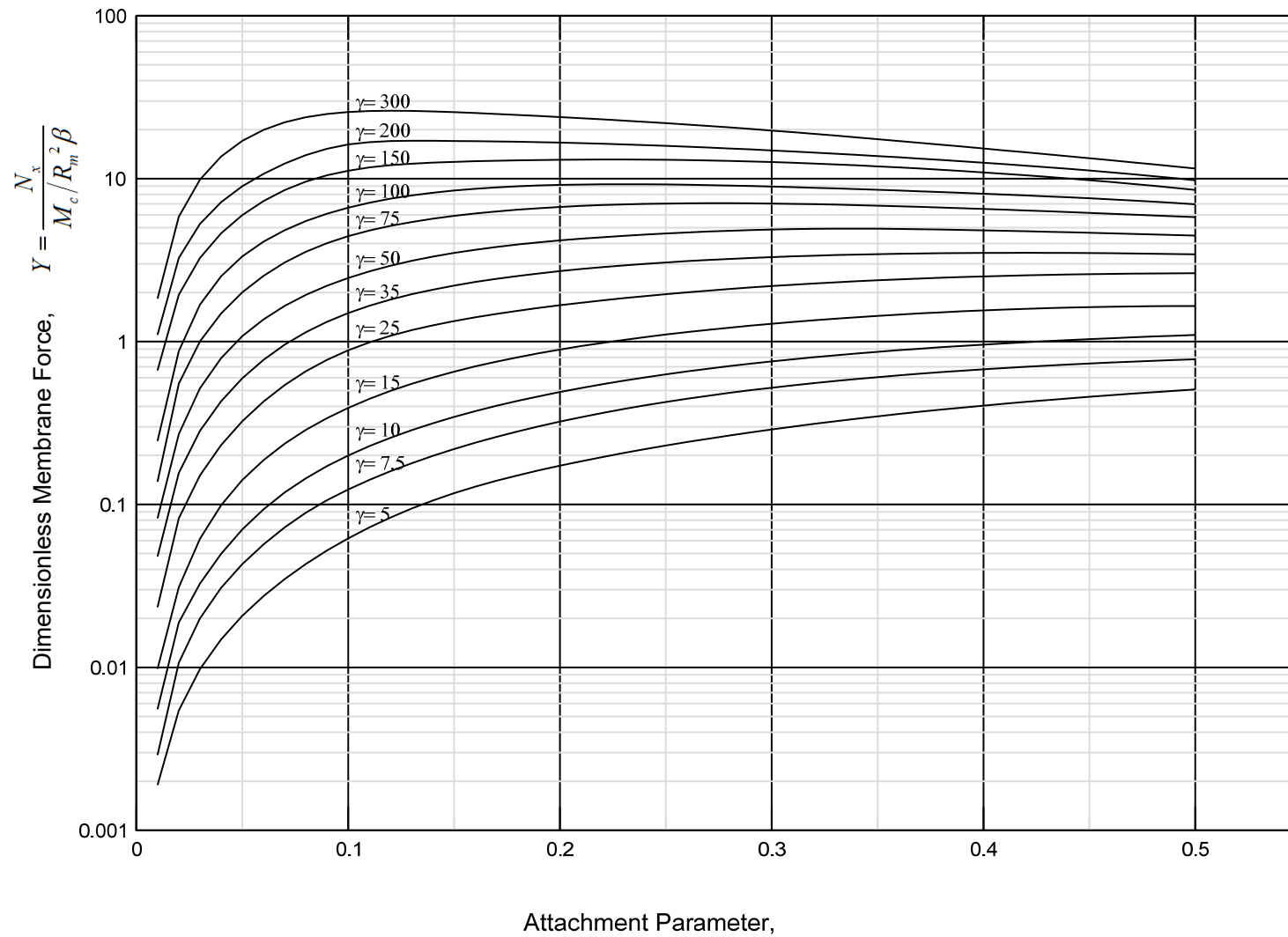


Figure 4A – Membrane Force $\frac{N_x}{(M_c / R_m^2 \beta)}$ Due to an External Circumferential Moment M_c on a Circular Cylinder – Original

Curve Fit Coefficients for Figure 4A – Original

Shell Parameter γ	$Y = (a + c\beta + e\beta^2 + g\beta^3 + i\beta^4) / (1 + b\beta + d\beta^2 + f\beta^3 + h\beta^4 + j\beta^5)$									
	Coefficients									
	a	b	c	d	e	f	g	h	i	j
5	-8.9588077E-04	-1.0457970E+01	2.5061533E-01	4.3031174E+01	1.1824023E+00	-5.2395915E+01	-2.7046982E+01	1.7696115E+02	1.2691723E+02	-4.0346310E+01
7.5	-3.3140260E-03	-2.1220032E+01	6.1100156E-01	1.2389299E+02	-3.7332931E+00	6.6891240E+01	-1.1638340E+02	4.9003857E+02	1.2555121E+03	6.6886838E+02
10	-1.1648336E-02	-1.4431293E+01	2.1639922E+00	7.1439732E+02	-6.5047324E+01	-1.4489682E+03	1.6405458E+03	3.2001690E+03	-8.5424030E+02	-2.1431786E+03
15	2.0637923E-03	1.7628487E+01	-8.9435633E-02	-3.5074928E+01	1.0285314E+02	4.1110651E+02	2.6541337E+01	-8.8879784E+02	2.6936808E+02	9.8642922E+02
25	-2.7228028E-02	-1.2363871E+01	5.0597456E+00	9.9070478E+01	-3.0140077E+01	-9.6383083E+01	3.7715102E+02	2.2341567E+02	4.8679924E+02	1.9450443E+02
35	-4.5336152E-02	-6.0281082E+00	9.0094840E+00	9.5109514E+01	-7.6383456E+00	1.8550518E+02	1.4383657E+03	-6.6824710E+01	7.8227326E+02	8.4985885E+02
50	6.9545543E-03	2.1013063E+01	-1.2520239E+00	-1.2197355E+02	1.1081457E+03	3.6889967E+02	-6.9319584E+03	-1.5521239E+03	1.2001421E+04	3.3806300E+03
75	-2.4044856E-01	-1.2299088E+01	3.9096093E+01	9.2010582E+01	-3.0031771E+02	8.6894638E+01	1.6416270E+03	3.1442550E+02	1.4725438E+04	4.3460455E+03
100	4.4165576E+01	7.5148226E+03	-9.5857906E+03	-1.3832738E+04	7.1082532E+05	2.0168647E+05	-9.9722279E+05	-3.8741927E+05	-3.2653494E+05	8.6665726E+04
150	-5.4249899E-01	-1.3950711E+01	1.2479865E+02	1.0971178E+02	-1.3365378E+03	-3.3930352E+02	7.4189398E+03	1.0909387E+03	-8.1851989E+03	-9.7272639E+02
200	-1.2159205E+00	-1.4951902E+01	2.5720616E+02	7.0819294E+01	-4.4129430E+03	-1.3547617E+02	2.7292632E+04	2.2687676E+03	-3.2082704E+04	-2.9454074E+03
300	-1.9533000E+00	-1.1589980E+01	3.8412396E+02	1.4555168E+02	-2.5265943E+03	-6.8417326E+02	1.0045023E+04	1.9247450E+03	-9.9041899E+03	-1.5832995E+03