NATIONAL INSTITUTE OF OCEANOGRAPHY

WORMLEY, GODALMING, SURREY

Table of the Integral

$$\int_{-1}^{1} P_n^m(z) P_s^r(z)\, dz$$

by

J. CREASE

INTERNAL REPORT NO. A 28

NOVEMBER 1966

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TABLES OF THE INTEGRAL $\int_{-1}^{1} P_n^m(z)\, P_s^r(z)\, dz$

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This integral, of the product of two Associated Legendre Functions, has been evaluated using a single series expression (a generalised hypergeometric function) found by the author.

$P_n^m(z)$ is defined to be

$$\frac{(1-z^2)^{m/2}}{2^n\, n!} \qquad \frac{d^{(m+n)}}{dz^{(m+n)}} \qquad (z^2-1)^n$$

The tables give the integral to 10 significant figures (in floating point form) for n, m, s and r integer and less than or equal to 10. When n + m + s + r is of odd parity the integral is zero and is not reproduced in the tables. When m + r is of odd parity the integral is a rational fraction times π and in these cases the value of the integral divided by π is also given. When m + r is even parity the integral itself is a rational fraction.

The computations were carried out on Atlas 1 computer to single precision (c. $11\frac{1}{2}$ decimal digits).* It is believed that the results are correct to ±1 in the last decimal given. They have been checked against computations performed by Dr. M.S. Longuet-Higgins using a double series.

Formulae for the Integral

1). n-m even and n-m ⩾ s-r.

$$\text{Integral} = (-1)^{(n-m)/2}\, 2^{(m+r)} \frac{\left(\frac{n+m-1}{2}\right)!\left(\frac{s+r-1}{2}\right)!\left(\frac{m+r}{2}\right)!\left(\frac{n+s-1}{2}\right)!}{\left(\frac{-1}{2}\right)!\left(\frac{n-m}{2}\right)!\left(\frac{s-r}{2}\right)!\left(\frac{n+r+1}{2}\right)!\left(\frac{n+r-1}{2}\right)!} \cdot$$

$$\cdot \left(1-\frac{n-s}{2}\right)^{(n-m-s+r)/2} {}_4F_3\left(\begin{matrix}\frac{1+n+m}{2}, & \frac{1+n-m}{2}, & \frac{1+s+r}{2}, & -\frac{s-r}{2} \\ \frac{1}{2}, & \frac{1+n+r}{2}, & \frac{3+n+r}{2} & \end{matrix}\right)$$

When s-r > n-m, then n, m and s, r are interchanged.

2). n-m odd and n-m ⩾ s-r

$$\text{Integral} = (-1)^{(n-m-1)/2}\, 2^{(m+r)} \frac{\left(\frac{n+m}{2}\right)!\left(\frac{s+r}{2}\right)!\left(\frac{m+r}{2}\right)!\left(\frac{n+s-1}{2}\right)!}{\left(\frac{1}{2}\right)!\left(\frac{n-m-1}{2}\right)!\left(\frac{s-r-1}{2}\right)!\left(\frac{s+r}{2}\right)\left(\frac{s+r}{2}+1\right)!} \cdot$$

$$\cdot \left(1-\frac{n-s}{2}\right)^{(n-m-s+r)/2} {}_4F_3\left(\begin{matrix}1+\frac{n-m}{2}, & 1+\frac{n+m}{2}, & 1+\frac{s+r}{2}, & \frac{1-s+r}{2} \\ \frac{3}{2}, & 1+\frac{n+r}{2}, & 2+\frac{n+r}{2} & \end{matrix}\right)$$

* Double length working was used in summing the ${}_4F_3$

3). Special cases

(a) $n = s, \quad m \geq r$

$$\text{Integral} = (-1)^{(m-r)/2} \cdot \frac{2}{(2n+1)} \quad \frac{(s+r)!}{(n-m)!}$$

(b) $m = r+2$

$$\text{Integral} = \frac{4(s+r)!}{(s-r)!} \quad (r+1) \quad , \quad n \geq s+2$$

$$= -\frac{2}{(2n+1)} \frac{(s+r)!}{(n-m)!} \quad , \quad n = s$$

$$= 0 \quad , \quad n \leq s-2$$

(c) $n = s+2$

$$\text{Integral} = (-1)^{(n+s-m-r)/2} \frac{(s+r)!}{(n-m)!} \quad (m^2-r^2) \quad , \quad m \geq r+2$$

$$= 0 \qquad \text{otherwise}$$

where,

(a) $$F\left(\begin{matrix} a_1, a_2, a_3, a_4 \\ b_1, b_2, b_3 \end{matrix}\right) = \sum_{p=o}^{\infty} \frac{(a_1)_p (a_2)_p (a_3)_p (a_4)_p}{(b_1)_p (b_2)_p (b_3)_p \; p\,!}$$

although in the present application the series always terminates

(b) $(a)_r = a(a+1) \qquad (a+r-1) \; , \quad (a)_o = 1$

and (c) the factorial can be non-integral and is then given by

$$x! = \Gamma(x+1)$$

Acknowledgement I wish to thank Mrs. P. Edwards for considerable help in the preparation of the computer program.

Reference Crease J. On the product of two Associated Legendre Polynomials. - Submitted for publication.

N	M	S	R	INTEGRAL		INTEGRAL/Π	
0	0	0	0	2.000000000			
1	0	1	0	6.666666667,	-1		
1	1	0	0	1.570796327		5.000000000,	-1
1	1	1	1	1.333333333			
2	0	0	0	0.000000000,	0		
2	0	1	1	-1.963495409,	-1	-6.250000000,	-2
2	0	2	0	4.000000000,	-1		
2	1	1	0	1.178097245		3.750000000,	-1
2	1	2	1	2.400000000			
2	2	0	0	4.000000000			
2	2	1	1	3.534291735		1.125000000	
2	2	2	0	-8.000000000,	-1		
2	2	2	2	9.600000000			
3	0	1	0	0.000000000,	0		
3	0	2	1	-2.945243113,	-1	-9.375000000,	-2
3	0	3	0	2.857142857,	-1		
3	1	0	0	5.890486225,	-1	1.875000000,	-1
3	1	1	1	0.000000000,	0		
3	1	2	0	1.030835089		3.281250000,	-1
3	1	2	2	-8.835729338,	-1	-2.812500000,	-1
3	1	3	1	3.428571429			
3	2	1	0	4.000000000			
3	2	2	1	8.835729338		2.812500000	
3	2	3	0	-1.714285714			
3	2	3	2	3.428571429,	1		
3	3	0	0	1.767145868,	1	5.625000000	
3	3	1	1	1.600000000,	1		
3	3	2	0	-4.417864669		-1.406250000	
3	3	2	2	4.417864669,	1	1.406250000,	1
3	3	3	1	-6.857142857			
3	3	3	3	2.057142857,	2		
4	0	0	0	0.000000000,	0		
4	0	1	1	-2.454369261,	-2	-7.812500000,	-3
4	0	2	0	0.000000000,	0		
4	0	2	2	0.000000000,	0		
4	0	3	1	-3.543495620,	-1	-1.127929688,	-1
4	0	3	3	4.141748127,	-1	1.318359375,	-1
4	0	4	0	2.222222222,	-1		
4	1	1	0	4.908738521,	-1	1.562500000,	-1
4	1	2	1	0.000000000,	0		
4	1	3	0	9.510680885,	-1	3.027343750,	-1
4	1	3	2	-2.761165418		-8.789062500,	-1
4	1	4	1	4.444444444			
4	2	0	0	4.000000000			
4	2	1	1	1.472621556		4.687500000,	-1
4	2	2	0	4.000000000			
4	2	2	2	0.000000000,	0		
4	2	3	1	1.573864288,	1	5.009765625	
4	2	3	3	-1.380582709,	1	-4.394531250	
4	2	4	0	-2.666666667			
4	2	4	2	8.000000000,	1		
4	3	1	0	2.061670179,	1	6.562500000	
4	3	2	1	4.800000000,	1		
4	3	3	0	-1.159689476,	1	-3.691406250	
4	3	3	2	1.932815793,	2	6.152343750,	1
4	3	4	1	-2.666666667,	1		
4	3	4	3	1.120000000,	3		
4	4	0	0	1.120000000,	2		
4	4	1	1	1.030835089,	2	3.281250000,	1
4	4	2	0	-3.200000000,	1		

N	M	S	R	INTEGRAL		INTEGRAL/Π	
4	4	2	2	2.880000000,	2		
4	4	3	1	-5.798447378,	1	-1.845703125,	1
4	4	3	3	1.352971055,	3	4.306640625,	2
4	4	4	0	5.333333333			
4	4	4	2	-1.600000000,	2		
4	4	4	4	8.960000000,	3		
5	0	1	0	0.000000000,	0		
5	0	2	1	-4.601942364,	-2	-1.464843750,	-2
5	0	3	0	0.000000000,	0		
5	0	3	2	0.000000000,	0		
5	0	4	1	-3.950000529,	-1	-1.257324219,	-1
5	0	4	3	1.449611845		4.614257813,	-1
5	0	5	0	1.818181818,	-1		
5	1	0	0	3.681553891,	-1	1.171875000,	-1
5	1	1	1	0.000000000,	0		
5	1	2	0	4.371845245,	-1	1.391601563,	-1
5	1	2	2	-1.380582709,	-1	-4.394531250,	-2
5	1	3	1	0.000000000,	0		
5	1	3	3	0.000000000,	0		
5	1	4	0	9.002549749,	-1	2.865600586,	-1
5	1	4	2	-5.694903675		-1.812744141	
5	1	4	4	7.248059223		2.307128906	
5	1	5	1	5.454545455			
5	2	1	0	4.000000000			
5	2	2	1	3.865631585		1.230468750	
5	2	3	0	4.000000000			
5	2	3	2	0.000000000,	0		
5	2	4	1	2.416019741,	1	7.690429688	
5	2	4	3	-6.764855275,	1	-2.153320313,	1
5	2	5	0	-3.636363636			
5	2	5	2	1.527272727,	2		
5	3	0	0	3.092505268,	1	9.843750000	
5	3	1	1	1.600000000,	1		
5	3	2	0	2.126097372,	1	6.767578125	
5	3	2	2	1.932815793,	1	6.152343750	
5	3	3	1	9.600000000,	1		
5	3	3	3	0.000000000,	0		
5	3	4	0	-2.101937175,	1	-6.690673828	
5	3	4	2	5.266923035,	2	1.676513672,	2
5	3	4	4	-4.735398692,	2	-1.507324219,	2
5	3	5	1	-6.545454545,	1		
5	3	5	3	3.665454545,	3		
5	4	1	0	1.440000000,	2		
5	4	2	1	3.479068427,	2	1.107421875,	2
5	4	3	0	-9.600000000,	1		
5	4	3	2	1.440000000,	3		
5	4	4	1	-2.609301320,	2	-8.305664063,	1
5	4	4	3	8.523717646,	3	2.713183594,	3
5	4	5	0	2.181818182,	1		
5	4	5	2	-9.163636364,	2		
5	4	5	4	6.597818182,	4		
5	5	0	0	9.277515805,	2	2.953125000,	2
5	5	1	1	8.640000000,	2		
5	5	2	0	-2.899223689,	2	-9.228515625,	1
5	5	2	2	2.435347899,	3	7.751953125,	2
5	5	3	1	-5.760000000,	2		
5	5	3	3	1.152000000,	4		
5	5	4	0	6.523253300,	1	2.076416016,	1
5	5	4	2	-1.826510924,	3	-5.813964844,	2
5	5	4	4	7.671345881,	4	2.441865234,	4

N	M	S	R	INTEGRAL		INTEGRAL/Π	
5	5	5	1	1.309090909,	2		
5	5	5	3	-7.330909091,	3		
5	5	5	5	6.597818182,	5		
6	0	0	0	0.000000000,	0		
6	0	1	1	-7.669903939,	-3	-2.441406250,	-3
6	0	2	0	0.000000000,	0		
6	0	2	2	0.000000000,	0		
6	0	3	1	-6.327670750,	-2	-2.014160156,	-2
6	0	3	3	3.451456773,	-2	1.098632813,	-2
6	0	4	0	0.000000000,	0		
6	0	4	2	0.000000000,	0		
6	0	4	4	0.000000000,	0		
6	0	5	1	-4.246010884,	-1	-1.351547241,	-1
6	0	5	3	3.231426404		1.028594971	
6	0	5	5	-4.530037014		-1.441955566	
6	0	6	0	1.538461538,	-1		
6	1	1	0	3.221359655,	-1	1.025390625,	-1
6	1	2	1	0.000000000,	0		
6	1	3	0	4.026699568,	-1	1.281738281,	-1
6	1	3	2	-4.832039482,	-1	-1.538085938,	-1
6	1	4	1	0.000000000,	0		
6	1	4	3	0.000000000,	0		
6	1	5	0	8.647337323,	-1	2.752532959,	-1
6	1	5	2	-9.724479457		-3.095397949	
6	1	5	4	3.805231092,	1	1.211242676,	1
6	1	6	1	6.461538462			
6	2	0	0	4.000000000			
6	2	1	1	9.664078964,	-1	3.076171875,	-1
6	2	2	0	4.000000000			
6	2	2	2	0.000000000,	0		
6	2	3	1	7.006457249		2.230224609	
6	2	3	3	-2.416019741		-7.690429688,	-1
6	2	4	0	4.000000000			
6	2	4	2	0.000000000,	0		
6	2	4	4	0.000000000,	0		
6	2	5	1	3.405077822,	1	1.083869934,	1
6	2	5	3	-2.008316410,	2	-6.392669678,	1
6	2	5	5	2.663661764,	2	8.478698731,	1
6	2	6	0	-4.615384615			
6	2	6	2	2.584615385,	2		
6	3	1	0	3.479068427,	1	1.107421875,	1
6	3	2	1	4.800000000,	1		
6	3	3	0	2.029456582,	1	6.459960938	
6	3	3	2	8.697671067,	1	2.768554688,	1
6	3	4	1	1.600000000,	2		
6	3	4	3	0.000000000,	0		
6	3	5	0	-3.243506502,	1	-1.032440186,	1
6	3	5	2	1.141569328,	3	3.633728027,	2
6	3	5	4	-3.196394117,	3	-1.017443848,	3
6	3	6	1	-1.292307692,	2		
6	3	6	3	9.304615385,	3		
6	4	0	0	2.880000000,	2		
6	4	1	1	1.739534213,	2	5.537109375,	1
6	4	2	0	1.440000000,	2		
6	4	2	2	2.880000000,	2		
6	4	3	1	7.393020407,	2	2.353271484,	2
6	4	3	3	6.088369747,	2	1.937988281,	2
6	4	4	0	-1.920000000,	2		
6	4	4	2	4.320000000,	3		
6	4	4	4	0.000000000,	0		

N	M	S	R	INTEGRAL		INTEGRAL/Π	
6	4	5	1	-7.202758853,	2	-2.292709351,	2
6	4	5	3	3.143120882,	4	1.000486450,	4
6	4	5	5	-2.876754706,	4	-9.156994629,	3
6	4	6	0	5.538461538,	1		
6	4	6	2	-3.101538462,	3		
6	4	6	4	2.791384615,	5		
6	5	1	0	1.275658423,	3	4.060546875,	2
6	5	2	1	3.168000000,	3		
6	5	3	0	-9.567438174,	2	-3.045410156,	2
6	5	3	2	1.339441344,	4	4.263574219,	3
6	5	4	1	-2.880000000,	3		
6	5	4	3	8.064000000,	4		
6	5	5	0	2.989824429,	2	9.516906738,	1
6	5	5	2	-1.172011176,	4	-3.730627441,	3
6	5	5	4	6.328860352,	5	2.014538818,	5
6	5	6	1	7.753846154,	2		
6	5	6	3	-5.582769231,	4		
6	5	6	5	6.141046154,	6		
6	6	0	0	9.504000000,	3		
6	6	1	1	8.929608962,	3	2.842382813,	3
6	6	2	0	-3.168000000,	3		
6	6	2	2	2.534400000,	4		
6	6	3	1	-6.697206722,	3	-2.131787109,	3
6	6	3	3	1.205497210,	5	3.837216797,	4
6	6	4	0	8.640000000,	2		
6	6	4	2	-2.304000000,	4		
6	6	4	4	8.064000000,	5		
6	6	5	1	2.092877101,	3	6.661834717,	2
6	6	5	3	-1.054810059,	5	-3.357564697,	4
6	6	5	5	6.961746387,	6	2.215992700,	6
6	6	6	0	-1.107692308,	2		
6	6	6	2	6.203076923,	3		
6	6	6	4	-5.582769231,	5		
6	6	6	6	7.369255385,	7		
7	0	1	0	0.000000000,	0		
7	0	2	1	-1.610679827,	-2	-5.126953125,	-3
7	0	3	0	0.000000000,	0		
7	0	3	2	0.000000000,	0		
7	0	4	1	-7.717840839,	-2	-2.456665039,	-2
7	0	4	3	1.409344849,	-1	4.486083984,	-2
7	0	5	0	0.000000000,	0		
7	0	5	2	0.000000000,	0		
7	0	5	4	0.000000000,	0		
7	0	6	1	-4.472153208,	-1	-1.423530579,	-1
7	0	6	3	5.843747748		1.860122681	
7	0	6	5	-2.491520358,	1	-7.930755615	
7	0	7	0	1.333333333,	-1		
7	1	0	0	2.684466379,	-1	8.544921875,	-2
7	1	1	1	0.000000000,	0		
7	1	2	0	2.926068353,	-1	9.313964844,	-2
7	1	2	2	-4.832039482,	-2	-1.538085938,	-2
7	1	3	1	0.000000000,	0		
7	1	3	3	0.000000000,	0		
7	1	4	0	3.783419803,	-1	1.204299927,	-1
7	1	4	2	-1.077142134		-3.428649902,	-1
7	1	4	4	7.046724244,	-1	2.243041992,	-1
7	1	5	1	0.000000000,	0		
7	1	5	3	0.000000000,	0		
7	1	5	5	0.000000000,	0		
7	1	6	0	8.383504612,	-1	2.668552399,	-1

N	M	S	R	INTEGRAL		INTEGRAL/ Π	
7	1	6	2	-1.487739656,	1	-4.735622406	
7	1	6	4	1.189134716,	2	3.7851333 62,	1
7	1	6	6	-1.744064250,	2	-5.551528931,	1
7	1	7	1	7.466666667			
7	2	1	0	4.000000000			
7	2	2	1	2.609301320		8.305664063,	-1
7	2	3	0	4.000000000			
7	2	3	2	0.000000000,	0		
7	2	4	1	1.081168834,	1	3.441467285	
7	2	4	3	-1.268410364,	1	-4.037475586	
7	2	5	0	4.000000000			
7	2	5	2	0.000000000,	0		
7	2	5	4	0.000000000,	0		
7	2	6	1	4.537738077,	1	1.444406891,	1
7	2	6	3	-4.661408088,	2	-1.483772278,	2
7	2	6	5	1.883589391,	3	5.995651245,	2
7	2	7	0	-5.600000000			
7	2	7	2	4.032000000,	2		
7	3	0	0	4.348835534,	1	1.384277344,	1
7	3	1	1	1.600000000,	1		
7	3	2	0	3.696510204,	1	1.176635742,	1
7	3	2	2	1.304650660,	1	4.152832031	
7	3	3	1	9.600000000,	1		
7	3	3	3	0.000000000,	0		
7	3	4	0	1.804464744,	1	5.743789673	
7	3	4	2	2.400919618,	2	7.642364502,	1
7	3	4	4	-8.878872548,	1	-2.826232910,	1
7	3	5	1	2.400000000,	2		
7	3	5	3	0.000000000,	0		
7	3	5	5	0.000000000,	0		
7	3	6	0	-4.569674838,	1	-1.454572678,	1
7	3	6	2	2.152333836,	3	6.851091385,	2
7	3	6	4	-1.247164490,	4	-3.969847870,	3
7	3	6	6	1.695230451,	4	5.396086121,	3
7	3	7	1	-2.240000000,	2		
7	3	7	3	2.016000000,	4		
7	4	1	0	3.520000000,	2		
7	4	2	1	5.740462904,	2	1.827246094,	2
7	4	3	0	1.120000000,	2		
7	4	3	2	1.440000000,	3		
7	4	4	1	1.262370315,	3	4.018249512,	2
7	4	4	3	3.906703921,	3	1.243542480,	3
7	4	5	0	-3.200000000,	2		
7	4	5	2	1.008000000,	4		
7	4	5	4	0.000000000,	0		
7	4	6	1	-1.569657825,	3	-4.996376038,	2
7	4	6	3	8.831941364,	4	2.811294250,	4
7	4	6	5	-2.486337995,	5	-7.914259644,	4
7	4	7	0	1.120000000,	2		
7	4	7	2	-8.064000000,	3		
7	4	7	4	8.870400000,	5		
7	5	0	0	3.189146058,	3	1.015136719,	3
7	5	1	1	2.112000000,	3		
7	5	2	0	1.179984041,	3	3.756005859,	2
7	5	2	2	4.018324033,	3	1.279072266,	3
7	5	3	1	6.912000000,	3		
7	5	3	3	1.152000000,	4		
7	5	4	0	-2.043046693,	3	-6.503219604,	2
7	5	4	2	4.269469285,	4	1.359014282,	4
7	5	4	4	3.516033529,	4	1.119188232,	4

N	M	S	R	INTEGRAL		INTEGRAL/Π	
7	5	5	1	-8.640000000,	3		
7	5	5	3	3.225600000,	5		
7	5	5	5	0.000000000,	0		
7	5	6	0	8.346593198,	2	2.656803131,	2
7	5	6	2	-4.363648755,	4	-1.388992538,	4
7	5	6	4	2.949700986,	6	9.389189850,	5
7	5	6	6	-2.734971795,	6	-8.705685608,	5
7	5	7	1	2.688000000,	3		
7	5	7	3	-2.419200000,	5		
7	5	7	5	3.193344000,	7		
7	6	1	0	1.372800000,	4		
7	6	2	1	3.482547495,	4	1.108529297,	4
7	6	3	0	-1.123200000,	4		
7	6	3	2	1.497600000,	5		
7	6	4	1	-3.627653641,	4	-1.154718018,	4
7	6	4	3	9.141687175,	5	2.909889404,	5
7	6	5	0	4.320000000,	3		
7	6	5	2	-1.612800000,	5		
7	6	5	4	7.257600000,	6		
7	6	6	1	1.360370115,	4	4.330192566,	3
7	6	6	3	-8.815198348,	5	-2.805964783,	5
7	6	6	5	7.110926667,	7	2.263478258,	7
7	6	7	0	-6.720000000,	2		
7	6	7	2	4.838400000,	4		
7	6	7	4	-5.322240000,	6		
7	6	7	6	8.302694400,	8		
7	7	0	0	1.160849165,	5	3.695097656,	4
7	7	1	1	1.098240000,	5		
7	7	2	0	-4.062972078,	4	-1.293284180,	4
7	7	2	2	3.134292746,	5	9.976763672,	4
7	7	3	1	-8.985600000,	4		
7	7	3	3	1.497600000,	6		
7	7	4	0	1.269678774,	4	4.041513062,	3
7	7	4	2	-3.264888277,	5	-1.039246216,	5
7	7	4	4	1.005585589,	7	3.200878345,	6
7	7	5	1	3.456000000,	4		
7	7	5	3	-1.612800000,	6		
7	7	5	5	8.709120000,	7		
7	7	6	0	-2.267283526,	3	-7.216987610,	2
7	7	6	2	1.224333104,	5	3.897173309,	4
7	7	6	4	-9.696718182,	6	-3.086561261,	6
7	7	6	6	9.244204667,	8	2.942521735,	8
7	7	7	1	-5.376000000,	3		
7	7	7	3	4.838400000,	5		
7	7	7	5	-6.386688000,	7		
7	7	7	7	1.162377216,	10		
8	0	0	0	0.000000000,	0		
8	0	1	1	-3.355582973,	-3	-1.068115234,	-3
8	0	2	0	0.000000000,	0		
8	0	2	2	0.000000000,	0		
8	0	3	1	-2.390852869,	-2	-7.610321045,	-3
8	0	3	3	7.550061690,	-3	2.403259277,	-3
8	0	4	0	0.000000000,	0		
8	0	4	2	0.000000000,	0		
8	0	4	4	0.000000000,	0		
8	0	5	1	-8.855593191,	-2	-2.818822861,	-2
8	0	5	3	3.529653840,	-1	1.123523712,	-1
8	0	5	5	-2.831273134,	-1	-9.012222290,	-2
8	0	6	0	0.000000000,	0		
8	0	6	2	0.000000000,	0		

N	M	S	R	INTEGRAL		INTEGRAL/Π	
8	0	6	4	0.000000000,	0		
8	0	6	6	0.000000000,	0		
8	0	7	1	-4.651116541,	-1	-1.480496377,	-1
8	0	7	3	9.347182820		2.975300700	
8	0	7	5	-8.068243659,	1	-2.568201721,	1
8	0	7	7	1.239920678,	2	3.946790099,	1
8	0	8	0	1.176470588,	-1		
8	1	1	0	2.416019741,	-1	7.690429688,	-2
8	1	2	1	0.000000000,	0		
8	1	3	0	2.718022209,	-1	8.651733399,	-2
8	1	3	2	-1.812014806,	-1	-5.767822266,	-2
8	1	4	1	0.000000000,	0		
8	1	4	3	0.000000000,	0		
8	1	5	0	3.601379426,	-1	1.146354675,	-1
8	1	5	2	-1.947915916		-6.200408936,	-1
8	1	5	4	4.077033313		1.297760010	
8	1	6	1	0.000000000,	0		
8	1	6	3	0.000000000,	0		
8	1	6	5	0.000000000,	0		
8	1	7	0	8.178975088,	-1	2.603448629,	-1
8	1	7	2	-2.117381770,	1	-6.739835501	
8	1	7	4	2.873034413,	2	9.145152569,	1
8	1	7	6	-1.275346983,	3	-4.059555531,	2
8	1	8	1	8.470588235			
8	2	0	0	4.000000000			
8	2	1	1	7.248059223,	-1	2.307128906,	-1
8	2	2	0	4.000000000			
8	2	2	2	0.000000000,	0		
8	2	3	1	4.801839235		1.528472900	
8	2	3	3	-9.060074028,	-1	-2.883911133,	-1
8	2	4	0	4.000000000			
8	2	4	2	0.000000000,	0		
8	2	4	4	0.000000000,	0		
8	2	5	1	1.523224946,	1	4.848575592	
8	2	5	3	-3.963782387,	1	-1.261711121,	1
8	2	5	5	2.853923319,	1	9.084320068	
8	2	6	0	4.000000000			
8	2	6	2	0.000000000,	0		
8	2	6	4	0.000000000,	0		
8	2	6	6	0.000000000,	0		
8	2	7	1	5.811648189,	1	1.849905074,	1
8	2	7	3	-9.301263108,	2	-2.960684001,	2
8	2	7	5	7.622650815,	3	2.426365113,	3
8	2	7	7	-1.147812285,	4	-3.653599978,	3
8	2	8	0	-6.588235294			
8	2	8	2	5.929411765,	2		
8	3	1	0	4.783719087,	1	1.522705078,	1
8	3	2	1	4.800000000,	1		
8	3	3	0	3.787110944,	1	1.205474854,	1
8	3	3	2	5.979648859,	1	1.903381348,	1
8	3	4	1	1.600000000,	2		
8	3	4	3	0.000000000,	0		
8	3	5	0	1.469997011,	1	4.679145813	
8	3	5	2	5.232192751,	2	1.665458679,	2
8	3	5	4	-6.278631302,	2	-1.998550415,	2
8	3	6	1	3.360000000,	2		
8	3	6	3	0.000000000,	0		
8	3	6	5	0.000000000,	0		
8	3	7	0	-6.070745072,	1	-1.932378173,	1
8	3	7	2	3.690330950,	3	1.174668825,	3

N	M	S	R	INTEGRAL		INTEGRAL/π	
8	3	7	4	-3.676269432,	4	-1.170192904,	4
8	3	7	6	1.515112216,	5	4.822751970,	4
8	3	8	1	-3.557647059,	2		
8	3	8	3	3.913411765,	4		
8	4	0	0	5.280000000,	2		
8	4	1	1	2.391859544,	2	7.613525391,	1
8	4	2	0	3.840000000,	2		
8	4	2	2	2.880000000,	2		
8	4	3	1	1.225828016,	3	3.901931763,	2
8	4	3	3	4.185754201,	2	1.332366943,	2
8	4	4	0	4.800000000,	1		
8	4	4	2	4.320000000,	3		
8	4	4	4	0.000000000,	0		
8	4	5	1	1.887326671,	3	6.007547378,	2
8	4	5	3	1.454549585,	4	4.629975128,	3
8	4	5	5	-5.650768172,	3	-1.798695374,	3
8	4	6	0	-4.800000000,	2		
8	4	6	2	2.016000000,	4		
8	4	6	4	0.000000000,	0		
8	4	6	6	0.000000000,	0		
8	4	7	1	-2.963546676,	3	-9.433262050,	2
8	4	7	3	2.091421897,	5	6.657202660,	4
8	4	7	5	-1.206262418,	6	-3.839652530,	5
8	4	7	7	1.666623438,	6	5.305027167,	5
8	4	8	0	1.976470588,	2		
8	4	8	2	-1.778823529,	4		
8	4	8	4	2.348047059,	6		
8	5	1	0	4.145889875,	3	1.319677734,	3
8	5	2	1	7.488000000,	3		
8	5	3	0	5.182362344,	2	1.649597168,	2
8	5	3	2	2.176592185,	4	6.928308105,	3
8	5	4	1	1.152000000,	4		
8	5	4	3	8.064000000,	4		
8	5	5	0	-3.562874112,	3	-1.134098053,	3
8	5	5	2	1.033881288,	5	3.290946350,	4
8	5	5	4	2.938399449,	5	9.353215942,	4
8	5	6	1	-2.016000000,	4		
8	5	6	3	9.676800000,	5		
8	5	6	5	0.000000000,	0		
8	5	7	0	1.832046063,	3	5.831583738,	2
8	5	7	2	-1.231985186,	5	-3.921530643,	4
8	5	7	4	1.020175559,	7	3.247319660,	6
8	5	7	6	-2.888813959,	7	-9.195380424,	6
8	5	8	1	7.115294118,	3		
8	5	8	3	-7.826823529,	5		
8	5	8	5	1.220984471,	8		
8	6	0	0	4.118400000,	4		
8	6	1	1	2.902122913,	4	9.237744141,	3
8	6	2	0	1.123200000,	4		
8	6	2	2	5.990400000,	4		
8	6	3	1	7.618072646,	4	2.424907837,	4
8	6	3	3	1.958932966,	5	6.235477295,	4
8	6	4	0	-2.505600000,	4		
8	6	4	2	4.953600000,	5		
8	6	4	4	8.064000000,	5		
8	6	5	1	-1.156314598,	5	-3.680663681,	4
8	6	5	3	3.868892608,	6	1.231506766,	6
8	6	5	5	3.232239394,	6	1.028853754,	6
8	6	6	0	1.296000000,	4		
8	6	6	2	-6.451200000,	5		

N	M	S	R	INTEGRAL		INTEGRAL/Π	
8	6	6	4	3.628800000,	7		
8	6	6	6	0.000000000,	0		
8	6	7	1	5.108473194,	4	1.626077521,	4
8	6	7	3	-4.139011099,	6	-1.317488152,	6
8	6	7	5	4.011007073,	8	1.276743205,	8
8	6	7	7	-3.755458146,	8	-1.195399455,	8
8	6	8	0	-2.371764706,	3		
8	6	8	2	2.134588235,	5		
8	6	8	4	-2.817656471,	7		
8	6	8	6	5.128134776,	9		
8	7	1	0	1.741273748,	5	5.542646484,	4
8	7	2	1	4.492800000,	5		
8	7	3	0	-1.523614529,	5	-4.849815674,	4
8	7	3	2	1.958932966,	6	6.235477295,	5
8	7	4	1	-5.184000000,	5		
8	7	4	3	1.209600000,	7		
8	7	5	0	6.801850577,	4	2.165096283,	4
8	7	5	2	-2.448666208,	6	-7.794346619,	5
8	7	5	4	9.696718182,	7	3.086561261,	7
8	7	6	1	2.419200000,	5		
8	7	6	3	-1.451520000,	7		
8	7	6	5	9.580032000,	8		
8	7	7	0	-1.487904814,	4	-4.736148119,	3
8	7	7	2	1.033031056,	6	3.288239980,	5
8	7	7	4	-9.999740626,	7	-3.183016300,	7
8	7	7	6	1.126637444,	10	3.586198365,	9
8	7	8	1	-4.269176471,	4		
8	7	8	3	4.696094118,	6		
8	7	8	5	-7.325906824,	8		
8	7	8	7	1.538440433,	11		
8	8	0	0	1.647360000,	6		
8	8	1	1	1.567146373,	6	4.988381836,	5
8	8	2	0	-5.990400000,	5		
8	8	2	2	4.492800000,	6		
8	8	3	1	-1.371253076,	6	-4.364834106,	5
8	8	3	3	2.154826263,	7	6.859025024,	6
8	8	4	0	2.073600000,	5		
8	8	4	2	-5.184000000,	6		
8	8	4	4	1.451520000,	8		
8	8	5	1	6.121665519,	5	1.948586655,	5
8	8	5	3	-2.693532828,	7	-8.573781280,	6
8	8	5	5	1.260573364,	9	4.012529639,	8
8	8	6	0	-4.608000000,	4		
8	8	6	2	2.419200000,	6		
8	8	6	4	-1.741824000,	8		
8	8	6	6	1.341204480,	10		
8	8	7	1	-1.339114332,	5	-4.262533307,	4
8	8	7	3	1.136334162,	7	3.617063978,	6
8	8	7	5	-1.299966281,	9	-4.137921191,	8
8	8	7	7	1.689956166,	11	5.379297548,	10
8	8	8	0	4.743529412,	3		
8	8	8	2	-4.269176471,	5		
8	8	8	4	5.635312941,	7		
8	8	8	6	-1.025626955,	10		
8	8	8	8	2.461504693,	12		
9	0	1	0	0.000000000,	0		
9	0	2	1	-7.550061690,	-3	-2.403259277,	-3
9	0	3	0	0.000000000,	0		
9	0	3	2	0.000000000,	0		
9	0	4	1	-3.082941857,	-2	-9.813308716,	-3

N	M	S	R	INTEGRAL		INTEGRAL/Π	
9	0	4	3	3.397527761,	-2	1.081466675,	-2
9	0	5	0	0.000000000,	0		
9	0	5	2	0.000000000,	0		
9	0	5	4	0.000000000,	0		
9	0	6	1	-9.802693377,	-2	-3.120294213,	-2
9	0	6	3	6.996783732,	-1	2.227145433,	-1
9	0	6	5	-1.751850252		-5.576312542,	-1
9	0	7	0	0.000000000,	0		
9	0	7	2	0.000000000,	0		
9	0	7	4	0.000000000,	0		
9	0	7	6	0.000000000,	0		
9	0	8	1	-4.796621182,	-1	-1.526811942,	-1
9	0	8	3	1.378754810,	1	4.388712868	
9	0	8	5	-2.005381913,	2	-6.383328885,	1
9	0	8	7	9.299405085,	2	2.960092574,	2
9	0	9	0	1.052631579,	-1		
9	1	0	0	2.111401727 3,	-1	6.729125977,	-2
9	1	1	1	0.000000000,	0		
9	1	2	0	2.227268199,	-1	7.089614868,	-2
9	1	2	2	-2.265018507,	-2	-7.209777832,	-3
9	1	3	1	0.000000000,	0		
9	1	3	3	0.000000000,	0		
9	1	4	0	2.562302186,	-1	8.156061172,	-2
9	1	4	2	-4.246909701,	-1	-1.351833344,	-1
9	1	4	4	1.698763880,	-1	5.407333374,	-2
9	1	5	1	0.000000000,	0		
9	1	5	3	0.000000000,	0		
9	1	5	5	0.000000000,	0		
9	1	6	0	3.459314398,	-1	1.101133972,	-1
9	1	6	2	-3.115727607		-9.917668998,	-1
9	1	6	4	1.377591334,	1	4.385009408	
9	1	6	6	-1.226295176,	1	-3.903418779	
9	1	7	1	0.000000000,	0		
9	1	7	3	0.000000000,	0		
9	1	7	5	0.000000000,	0		
9	1	7	7	0.000000000,	0		
9	1	8	0	8.015282367,	-1	2.551343618,	-1
9	1	8	2	-2.862914823,	1	-9.112940915	
9	1	8	4	5.922348757,	2	1.885142159,	2
9	1	8	6	-5.300660899,	3	-1.687252767,	3
9	1	8	8	8.369464577,	3	2.664083317,	3
9	1	9	1	9.473684210			
9	2	1	0	4.000000000			
9	2	2	1	1.993216286		6.344604492,	-1
9	2	3	0	4.000000000			
9	2	3	2	0.000000000,	0		
9	2	4	1	7.474561073		2.379226685	
9	2	4	3	-4.983040716		-1.586151123	
9	2	5	0	4.000000000			
9	2	5	2	0.000000000,	0		
9	2	5	4	0.000000000,	0		
9	2	6	1	2.023581691,	1	6.441260576	
9	2	6	3	-9.576781375,	1	-3.048384190,	1
9	2	6	5	2.158279510,	2	6.870017052,	1
9	2	7	0	4.000000000			
9	2	7	2	0.000000000,	0		
9	2	7	4	0.000000000,	0		
9	2	7	6	0.000000000,	0		
9	2	8	1	7.225047545,	1	2.299804062,	1
9	2	8	3	-1.673308965,	3	-5.326307863,	2

N	M	S	R	INTEGRAL		INTEGRAL/Π	
9	2	8	5	2.3I4754774,	4	7.368093288,	3
9	2	8	7	-I.052I6I26I,	5	-3.349I333I3,	4
9	2	9	0	-7.578947368			
9	2	9	2	8.336842I05,	2		
9	3	0	0	5.58I005602,	I	I.776489258,	I
9	3	I	I	I.600000000,	I		
9	3	2	0	5.08270I530,	I	I.6I7874I46,	I
9	3	2	2	9.966081431		3.I72302246	
9	3	3	I	9.600000000,	I		
9	3	3	3	0.000000000,	0		
9	3	4	0	3.774653342,	I	I.20I509476,	I
9	3	4	2	I.6693I8640,	2	5.3I3606262,	I
9	3	4	4	-3.488I28501,	I	-I.II0305786,	I
9	3	5	I	2.400000000,	2		
9	3	5	3	0.000000000,	0		
9	3	5	5	0.000000000,	0		
9	3	6	0	I.038263249,	I	3.304894567	
9	3	6	2	9.878488919,	2	3.I44420683,	2
9	3	6	4	-2.540883605,	3	-8.0878837II,	2
9	3	6	6	I.942451559,	3	6.I830I5347,	2
9	3	7	I	4.480000000,	2		
9	3	7	3	0.000000000,	0		
9	3	7	5	0.000000000,	0		
9	3	7	7	0.000000000,	0		
9	3	8	0	-7.739844730,	I	-2.463669095,	I
9	3	8	2	5.903589360,	3	I.879I70857,	3
9	3	8	4	-9.0742I64I5,	4	-2.8884I2794,	4
9	3	8	6	7.5545I7855,	5	2.4046777I9,	5
9	3	8	8	-I.I57377387,	6	-3.684046644,	5
9	3	9	I	-5.3052631158,	2		
9	3	9	3	7.002947368,	4		
9	4	I	0	6.240000000,	2		
9	4	2	I	7.7735435I6,	2	2.474395752,	2
9	4	3	0	3.840000000,	2		
9	4	3	2	I.440000000,	3		
9	4	4	I	2.I37724467,	3	6.8045883I8,	2
9	4	4	3	2.720740231,	3	8.660385I32,	2
9	4	5	0	-4.800000000,	I		
9	4	5	2	I.008000000,	4		
9	4	5	4	0.000000000,	0		
9	4	6	I	2.57I949749,	3	8.I86770320,	2
9	4	6	3	4.I066I7286,	4	I.307I76881,	4
9	4	6	5	-5.050374053,	4	-I.607583990,	4
9	4	7	0	-6.720000000,	2		
9	4	7	2	3.628800000,	4		
9	4	7	4	0.000000000,	0		
9	4	7	6	0.000000000,	0		
9	4	8	I	-5.076336474,	3	-I.6I5848085,	3
9	4	8	3	4.394526867,	5	I.39882I347,	5
9	4	8	5	-4.322278461,	6	-I.375823965,	6
9	4	8	7	I.805508724,	7	5.747II2765,	6
9	4	9	0	3.I83I57895,	2		
9	4	9	2	-3.50I473684,	4		
9	4	9	4	5.462298947,	6		
9	5	0	0	7.255307282,	3	2.309436035,	3
9	5	I	I	3.744000000,	3		
9	5	2	0	4.534567051,	3	I.443397522,	3
9	5	2	2	5.44I480462,	3	I.732077026,	3
9	5	3	I	I.670400000,	4		
9	5	3	3	I.I52000000,	4		

N	M	S	R	INTEGRAL		INTEGRAL/Π	
9	5	4	0	−7.93549234 0,	2	−2.52594566 3,	2
9	5	4	2	6.93788758 8,	4	2.20839820 9,	4
9	5	4	4	2.44866620 8,	4	7.79434661 9,	3
9	5	5	1	1.58400000 0,	4		
9	5	5	3	3.22560000 0,	5		
9	5	5	5	0.00000000 0,	0		
9	5	6	0	−5.50879044 1,	3	−1.75350245 8,	3
9	5	6	2	2.10836112 1,	5	6.71112188 5,	4
9	5	6	4	1.37967036 6,	6	4.39162717 3,	5
9	5	6	6	−5.55541145 9,	5	−1.76834238 9,	5
9	5	7	1	−4.03200000 0,	4		
9	5	7	3	2.41920000 0,	6		
9	5	7	5	0.00000000 0,	0		
9	5	7	7	0.00000000 0,	0		
9	5	8	0	3.47509911 5,	3	1.10615840 4,	3
9	5	8	2	−2.92261703 0,	5	−9.30297894 3,	4
9	5	8	4	2.91227715 5,	7	9.27006609 6,	6
9	5	8	6	−1.67912311 3,	8	−5.34481487 1,	7
9	5	8	8	2.34716134 1,	8	7.47124659 4,	7
9	5	9	1	1.59157894 7,	4		
9	5	9	3	−2.10088421 1,	6		
9	5	9	5	3.82360926 3,	8		
9	6	1	0	5.61600000 0,	4		
9	6	2	1	1.08829609 2,	5	3.46415405 3,	4
9	6	3	0	−1.44000000 0,	3		
9	6	3	2	3.45600000 0,	5		
9	6	4	1	1.17898743 3,	5	3.75283355 7,	4
9	6	4	3	1.46919972 5,	6	4.67660797 1,	5
9	6	5	0	−4.46400000 0,	4		
9	6	5	2	1.20960000 0,	6		
9	6	5	4	7.25760000 0,	6		
9	6	6	1	−2.82701914 6,	5	−8.99868142 6,	4
9	6	6	3	1.20749852 4,	7	3.84358717 6,	6
9	6	6	5	3.33324687 5,	7	1.06100543 3,	7
9	6	7	0	3.02400000 0,	4		
9	6	7	2	−1.93536000 0,	6		
9	6	7	4	1.33056000 0,	8		
9	6	7	6	0.00000000 0,	0		
9	6	8	1	1.45070719 3,	5	4.61774441 6,	4
9	6	8	3	−1.43725228 3,	7	−4.57491610 5,	6
9	6	8	5	1.64903130 1,	9	5.24902965 8,	8
9	6	8	7	−4.69432268 3,	9	−1.49424931 9,	9
9	6	9	0	−6.36631579 0,	3		
9	6	9	2	7.00294736 8,	5		
9	6	9	4	−1.09245978 9,	8		
9	6	9	6	2.29416555 8,	10		
9	7	0	0	6.09445811 7,	5	1.93992627 0,	5
9	7	1	1	4.49280000 0,	5		
9	7	2	0	1.19712570 2,	5	3.81056945 8,	4
9	7	2	2	9.79466483 1,	5	3.11773864 7,	5
9	7	3	1	9.67680000 0,	5		
9	7	3	3	3.45600000 0,	6		
9	7	4	0	−3.49615119 7,	5	−1.11285948 9,	5
9	7	4	2	6.61139876 1,	6	2.10447358 7,	6
9	7	4	4	1.61611969 7,	7	5.14426876 8,	6
9	7	5	1	−1.72800000 0,	6		
9	7	5	3	5.32224000 0,	7		
9	7	5	5	8.70912000 0,	7		
9	7	6	0	2.15746198 0,	5	6.86741473 4,	4
9	7	6	2	−1.03494407 7,	7	−3.29432931 3,	6

N	M	S	R	INTEGRAL		INTEGRAL/Π	
9	7	6	4	5.105928168,	8	1.625267414,	8
9	7	6	6	4.333220938,	8	1.379307063,	8
9	7	7	1	9.676800000,	5		
9	7	7	3	-7.257600000,	7		
9	7	7	5	5.748019200,	9		
9	7	7	7	0.000000000,	0		
9	7	8	0	-5.626140077,	4	-1.790856007,	4
9	7	8	2	4.882984762,	6	1.554302324,	6
9	7	8	4	-5.673463952,	8	-1.805919665,	8
9	7	8	6	7.463973065,	10	2.375856417,	10
9	7	8	8	-7.041484024,	10	-2.241373978,	10
9	7	9	1	-1.909894737,	5		
9	7	9	3	2.521061053,	7		
9	7	9	5	-4.588331116,	9		
9	7	9	7	1.101199468,	12		
9	8	1	0	2.545920000,	6		
9	8	2	1	6.660372085,	6	2.120062280,	6
9	8	3	0	-2.350080000,	6		
9	8	3	2	2.937600000,	7		
9	8	4	1	-8.325465106,	6	-2.650077850,	6
9	8	4	3	1.831602323,	8	5.830171271,	7
9	8	5	0	1.175040000,	6		
9	8	5	2	-4.112640000,	7		
9	8	5	4	1.480550400,	9		
9	8	6	1	4.552988730,	6	1.449261324,	6
9	8	6	3	-2.575690767,	8	-8.198678349,	7
9	8	6	5	1.473295119,	10	4.689644016,	9
9	8	7	0	-3.225600000,	5		
9	8	7	2	2.177280000,	7		
9	8	7	4	-1.916006400,	9		
9	8	7	6	1.743565824,	11		
9	8	8	1	-1.138247182,	6	-3.623153311,	5
9	8	8	3	1.180524935,	8	3.757727577,	7
9	8	8	5	-1.596069712,	10	-5.080447684,	9
9	8	8	7	2.394104568,	12	7.620671526,	11
9	8	9	0	3.819789474,	4		
9	8	9	2	-4.201768421,	6		
9	8	9	4	6.554758737,	8		
9	8	9	6	-1.376499335,	11		
9	8	9	8	3.744078190,	13		
9	9	0	0	2.664148834,	7	8.480249121,	6
9	9	1	1	2.545920000,	7		
9	9	2	0	-9.990558127,	6	-3.180093420,	6
9	9	2	2	7.326409293,	7	2.332068508,	7
9	9	3	1	-2.350080000,	7		
9	9	3	3	3.525120000,	8		
9	9	4	0	3.746459298,	6	1.192535033,	6
9	9	4	2	-9.158011617,	7	-2.915085635,	7
9	9	4	4	2.381083020,	9	7.579222652,	8
9	9	5	1	1.175040000,	7		
9	9	5	3	-4.935168000,	8		
9	9	5	5	2.072770560,	10		
9	9	6	0	-9.756404421,	5	-3.105559981,	5
9	9	6	2	5.008287603,	7	1.594187457,	7
9	9	6	4	-3.348397997,	9	-1.065828185,	9
9	9	6	6	2.209942678,	11	7.034466024,	10
9	9	7	1	-3.225600000,	6		
9	9	7	3	2.612736000,	8		
9	9	7	5	-2.682408960,	10		
9	9	7	7	2.789705318,	12		

N	M	S	R	INTEGRAL		INTEGRAL/Π	
9	9	8	0	1.422808978,	5	4.528941639,	4
9	9	8	2	-1.252071901,	7	-3.985468642,	6
9	9	8	4	1.534682415,	9	4.885045850,	8
9	9	8	6	-2.394104568,	11	-7.620671526,	10
9	9	8	8	4.069977766,	13	1.295514159,	13
9	9	9	1	3.819789474,	5		
9	9	9	3	-5.042122105,	7		
9	9	9	5	9.176662232,	9		
9	9	9	7	-2.202398936,	12		
9	9	9	9	6.739340743,	14		
10	0	0	0	0.000000000,	0		
10	0	1	1	-1.761681061,	-3	-5.607604980,	-4
10	0	2	0	0.000000000,	0		
10	0	2	2	0.000000000,	0		
10	0	3	1	-1.178348914,	-2	-3.750801086,	-3
10	0	3	3	2.426805543,	-3	7.724761963,	-4
10	0	4	0	0.000000000,	0		
10	0	4	2	0.000000000,	0		
10	0	4	4	0.000000000,	0		
10	0	5	1	-3.690977424,	-2	-1.174874604,	-2
10	0	5	3	9.183942228,	-2	2.923339605,	-2
10	0	5	5	-4.777773413,	-2	-1.520812511,	-2
10	0	6	0	0.000000000,	0		
10	0	6	2	0.000000000,	0		
10	0	6	4	0.000000000,	0		
10	0	6	6	0.000000000,	0		
10	0	7	1	-1.060338823,	-1	-3.375163302,	-2
10	0	7	3	1.205908535		3.838526085,	-1
10	0	7	5	-6.253132148		-1.990433782	
10	0	7	7	6.199603390		1.973395050	
10	0	8	0	0.000000000,	0		
10	0	8	2	0.000000000,	0		
10	0	8	4	0.000000000,	0		
10	0	8	6	0.000000000,	0		
10	0	8	8	0.000000000,	0		
10	0	9	1	-4.917477829,	-1	-1.565281808,	-1
10	0	9	3	1.920073497,	1	6.111783763	
10	0	9	5	-4.230952546,	2	-1.346754023,	2
10	0	9	7	3.945272607,	3	1.255819275,	3
10	0	9	9	-6.402640401,	3	-2.038023737,	3
10	0	10	0	9.523809524,	-2		
10	1	1	0	1.937849167,	-1	6.168365479,	-2
10	1	2	1	0.000000000,	0		
10	1	3	0	2.086153950,	-1	6.640434265,	-2
10	1	3	2	-8.898286992,	-2	-2.832412720,	-2
10	1	4	1	0.000000000,	0		
10	1	4	3	0.000000000,	0		
10	1	5	0	2.440695073,	-1	7.768973708,	-2
10	1	5	2	-7.980651146,	-1	-2.540320158,	-1
10	1	5	4	1.051110151		3.345787525,	-1
10	1	6	1	0.000000000,	0		
10	1	6	3	0.000000000,	0		
10	1	6	5	0.000000000,	0		
10	1	7	0	3.344929419,	-1	1.064724103,	-1
10	1	7	2	-4.595849368		-1.462904289	
10	1	7	4	3.550740927,	1	1.130235940,	1
10	1	7	6	-9.742233899,	1	-3.101049364,	1
10	1	8	1	0.000000000,	0		
10	1	8	3	0.000000000,	0		
10	1	8	5	0.000000000,	0		

N	M	S	R	INTEGRAL		INTEGRAL/Π	
10	1	8	7	0.000000000,	0		
10	1	9	0	7.880997203,	-1	2.508599323,	-1
10	1	9	2	-3.725553742,	1	-1.185880587,	1
10	1	9	4	1.094696550,	3	3.484527343,	2
10	1	9	6	-1.645219750,	4	-5.236897113,	3
10	1	9	8	7.825449379,	4	2.490917901,	4
10	1	10	1	1.047619048,	1		
10	2	0	0	4.000000000			
10	2	1	1	5.813547502,	-1	1.850509644,	-1
10	2	2	0	4.000000000			
10	2	2	2	0.000000000,	0		
10	2	3	1	3.710585676		1.181116104	
10	2	3	3	-4.449143496,	-1	-1.416206360,	-1
10	2	4	0	4.000000000			
10	2	4	2	0.000000000,	0		
10	2	4	4	0.000000000,	0		
10	2	5	1	1.058409527,	1	3.369022161	
10	2	5	3	-1.613648732,	1	-5.136403441	
10	2	5	5	7.355771057		2.342051268	
10	2	6	0	4.000000000			
10	2	6	2	0.000000000,	0		
10	2	6	4	0.000000000,	0		
10	2	6	6	0.000000000,	0		
10	2	7	1	2.579948243,	1	8.212230317	
10	2	7	3	-1.974116252,	2	-6.283807196,	1
10	2	7	5	9.240134152,	2	2.941226050,	2
10	2	7	7	-8.768010509,	2	-2.790944427,	2
10	2	8	0	4.000000000			
10	2	8	2	0.000000000,	0		
10	2	8	4	0.000000000,	0		
10	2	8	6	0.000000000,	0		
10	2	8	8	0.000000000,	0		
10	2	9	1	8.776569353,	1	2.793668792,	1
10	2	9	3	-2.790337044,	3	-8.881918669,	2
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10	2	9	7	-5.356158420,	5	-1.704918177,	5
10	2	9	9	8.607994317,	5	2.740009691,	5
10	2	10	0	-8.571428571			
10	2	10	2	1.131428571,	3		
10	3	1	0	6.046089402,	1	1.924530029,	1
10	3	2	1	4.800000000,	1		
10	3	3	0	5.274904529,	1	1.679054260,	1
10	3	3	2	4.627109236,	1	1.472854614,	1
10	3	4	1	1.600000000,	2		
10	3	4	3	0.000000000,	0		
10	3	5	0	3.674213928,	1	1.169538617,	1
10	3	5	2	3.664092126,	2	1.166316748,	2
10	3	5	4	-2.550693966,	2	-8.119111061,	1
10	3	6	1	3.360000000,	2		
10	3	6	3	0.000000000,	0		
10	3	6	5	0.000000000,	0		
10	3	7	0	5.177783434		1.648139656	
10	3	7	2	1.692112158,	3	5.386160284,	2
10	3	7	4	-7.715849248,	3	-2.456031096,	3
10	3	7	6	1.823746186,	4	5.805164409,	3
10	3	8	1	5.760000000,	2		
10	3	8	3	0.000000000,	0		
10	3	8	5	0.000000000,	0		
10	3	8	7	0.000000000,	0		
10	3	9	0	-9.571846476,	1	-3.046813362,	1

N	M	S	R	INTEGRAL		INTEGRAL/Π	
10	3	9	2	8.95664202 8,	3	2.85098770 4,	3
10	3	9	4	-1.97762477 0,	5	-6.29497511 56,	4
10	3	9	6	2.76981 4520,	6	8.81659344 6,	5
10	3	9	8	-1.27890201 3,	7	-4.07087154 2,	6
10	3	10	1	-7.54285714 3,	2		
10	3	10	3	1.17668571 4,	5		
10	4	0	0	8.320000000,	2		
10	4	1	1	3.02304470 1,	2	9.62265014 7,	1
10	4	2	0	6.880000000,	2		
10	4	2	2	2.880000000,	2		
10	4	3	1	1.65181 7799 7,	3	5.25809097 3,	2
10	4	3	3	3.23897646 5,	2	1.03099823 0,	2
10	4	4	0	3.520000000,	2		
10	4	4	2	4.320000000,	3		
10	4	4	4	0.000000000,	0		
10	4	5	1	3.30527426 5,	3	1.05210147 5,	3
10	4	5	3	1.02169463 9,	4	3.25215504 2,	3
10	4	5	5	-2.29562457 0,	3	-7.30719995 5,	2
10	4	6	0	-1.760000000,	2		
10	4	6	2	2.01600000 0,	4		
10	4	6	4	0.000000000,	0		
10	4	6	6	0.000000000,	0		
10	4	7	1	3.26305791 8,	3	1.03866359 4,	3
10	4	7	3	9.74205676 8,	4	3.10099298 1,	4
10	4	7	5	-2.51817261 8,	5	-8.01559239 5,	4
10	4	7	7	2.00612080 5,	5	6.38568085 0,	4
10	4	8	0	-8.960000000,	2		
10	4	8	2	6.048000000,	4		
10	4	8	4	0.000000000,	0		
10	4	8	6	0.000000000,	0		
10	4	8	8	0.000000000,	0		
10	4	9	1	-8.10169152 9,	3	-2.57884850 8,	3
10	4	9	3	8.44790505 9,	5	2.68905169 8,	5
10	4	9	5	-1.27360175 1,	7	-4.05400028 3,	6
10	4	9	7	1.07202080 5,	8	3.41234820 4,	7
10	4	9	9	-1.66257261 7,	8	-5.29213300 4,	7
10	4	10	0	4.800000000,	2		
10	4	10	2	-6.33600000 0,	4		
10	4	10	4	1.15315200 0,	7		
10	5	1	0	9.06913410 3,	3	2.88679504 4,	3
10	5	2	1	1.29600000 0,	4		
10	5	3	0	4.21066940 5,	3	1.34029769 9,	3
10	5	3	2	2.91507881 9,	4	9.27898407 0,	3
10	5	4	1	2.97600000 0,	4		
10	5	4	3	8.06400000 0,	4		
10	5	5	0	-2.81284862 4,	3	-8.95357525 4,	2
10	5	5	2	1.69621148 8,	5	5.39920885 6,	4
10	5	5	4	2.06606211 3,	5	6.57647995 9,	4
10	5	6	1	1.81440000 0,	4		
10	5	6	3	9.67680000 0,	5		
10	5	6	5	0.000000000,	0		
10	5	7	0	-7.85578315 3,	3	-2.50057344 1,	3
10	5	7	2	3.81424399 0,	5	1.21411157 0,	5
10	5	7	4	4.79084094 2,	6	1.52497203 5,	6
10	5	7	6	-6.01836241 4,	6	-1.91570425 5,	6
10	5	8	1	-7.25760000 0,	4		
10	5	8	3	5.32224000 0,	6		
10	5	8	5	0.000000000,	0		
10	5	8	7	0.000000000,	0		
10	5	9	0	5.97049483 3,	3	1.90046753 1,	3

N	M	S	R	INTEGRAL		INTEGRAL/Π	
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10	5	9	4	7.253836470,	7	2.308967861,	7
10	5	9	6	-7.094144695,	8	-2.258136390,	8
10	5	9	8	2.992630710,	9	9.525839407,	8
10	5	10	1	3.168000000,	4		
10	5	10	3	-4.942080000,	6		
10	5	10	5	1.037836800,	9		
10	6	0	0	1.123200000,	5		
10	6	1	1	6.348393872,	4	2.020756531,	4
10	6	2	0	6.048000000,	4		
10	6	2	2	1.036800000,	5		
10	6	3	1	2.497250855,	5	7.948996353,	4
10	6	3	3	2.623570937,	5	8.351085663,	4
10	6	4	0	-2.688000000,	4		
10	6	4	2	1.152000000,	6		
10	6	4	4	8.064000000,	5		
10	6	5	1	1.287037664,	5	4.096768123,	4
10	6	5	3	6.209664461,	6	1.976597588,	6
10	6	5	5	2.272668324,	6	7.234127955,	5
10	6	6	0	-6.912000000,	4		
10	6	6	2	2.419200000,	6		
10	6	6	4	3.628800000,	7		
10	6	6	6	0.000000000,	0		
10	6	7	1	-5.861725006,	5	-1.865845019,	5
10	6	7	3	3.100225040,	7	9.868322795,	6
10	6	7	5	1.891154651,	8	6.019732216,	7
10	6	7	7	-7.823871138,	7	-2.490415531,	7
10	6	8	0	6.048000000,	4		
10	6	8	2	-4.838400000,	6		
10	6	8	4	3.991680000,	8		
10	6	8	6	0.000000000,	0		
10	6	8	8	0.000000000,	0		
10	6	9	1	3.455368323,	5	1.099877898,	5
10	6	9	3	-4.110333727,	7	-1.308359861,	7
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10	6	9	9	4.488946065,	10	1.428875911,	10
10	6	10	0	-1.440000000,	4		
10	6	10	2	1.900800000,	6		
10	6	10	4	-3.459456000,	8		
10	6	10	6	8.302694400,	10		
10	7	1	0	8.633815666,	5	2.748228882,	5
10	7	2	1	1.762560000,	6		
10	7	3	0	-1.277452318,	5	-4.066257019,	4
10	7	3	2	5.946760790,	6	1.892912750,	6
10	7	4	1	1.305600000,	6		
10	7	4	3	2.741760000,	7		
10	7	5	0	-6.239280852,	5	-1.986024778,	5
10	7	5	2	1.587041786,	7	5.051710902,	6
10	7	5	4	1.545414460,	8	4.919207010,	7
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10	7	6	3	1.693440000,	8		
10	7	6	5	9.580032000,	8		
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10	7	7	2	-3.246714582,	7	-1.033461349,	7
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10	7	7	6	5.320232374,	9	1.693482561,	9
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10	7	8	3	-2.661120000,	8		
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N	M	S	R	INTEGRAL		INTEGRAL/Π	
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10	7	9	4	-2.340390684,	9	-7.449694921,	8
10	7	9	6	3.557905400,	11	1.132516463,	11
10	7	9	8	-1.017494441,	12	-3.238785398,	11
10	7	10	1	-6.336000000,	5		
10	7	10	3	9.884160000,	7		
10	7	10	5	-2.075673600,	10		
10	7	10	7	5.645832192,	12		
10	8	0	0	1.018368000,	7		
10	8	1	1	7.770434099,	6	2.473405994,	6
10	8	2	0	1.370880000,	6		
10	8	2	2	1.762560000,	7		
10	8	3	1	1.391542025,	7	4.429415836,	6
10	8	3	3	6.541436869,	7	2.082204025,	7
10	8	4	0	-5.483520000,	6		
10	8	4	2	9.987840000,	7		
10	8	4	4	3.290112000,	8		
10	8	5	1	-2.868382900,	7	-9.130346344,	6
10	8	5	3	8.270829241,	8	2.632686714,	8
10	8	5	5	2.009038798,	9	6.394969113,	8
10	8	6	0	3.893760000,	6		
10	8	6	2	-1.814400000,	8		
10	8	6	4	8.099481600,	9		
10	8	6	6	1.341204480,	10		
10	8	7	1	1.916049424,	7	6.098974740,	6
10	8	7	3	-1.354026327,	9	-4.309999660,	8
10	8	7	5	9.269481789,	10	2.950567693,	10
10	8	7	7	7.980348560,	10	2.540223842,	10
10	8	8	0	-1.290240000,	6		
10	8	8	2	1.088640000,	8		
10	8	8	4	-1.149603840,	10		
10	8	8	6	1.220496077,	12		
10	8	8	8	0.000000000,	0		
10	8	9	1	-5.410231139,	6	-1.722130058,	6
10	8	9	3	6.733910983,	8	2.143470439,	8
10	8	9	5	-1.062383902,	11	-3.381672990,	10
10	8	9	7	1.822512103,	13	5.801236199,	12
10	8	9	9	-1.729740550,	13	-5.505935177,	12
10	8	10	0	1.728000000,	5		
10	8	10	2	-2.280960000,	7		
10	8	10	4	4.151347200,	9		
10	8	10	6	-9.963233280,	11		
10	8	10	8	3.048749384,	14		
10	9	1	0	4.218235654,	7	1.342706111,	7
10	9	2	1	1.116288000,	8		
10	9	3	0	-4.067584380,	7	-1.294752321,	7
10	9	3	2	4.971492020,	8	1.582475059,	8
10	9	4	1	-1.488384000,	8		
10	9	4	3	3.125606400,	9		
10	9	5	0	2.224460208,	7	7.080676756,	6
10	9	5	2	-7.612597156,	8	-2.423164934,	8
10	9	5	4	2.544782478,	10	8.100294209,	9
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10	9	6	5	2.548288512,	11		
10	9	7	0	-7.208898822,	6	-2.294663764,	6
10	9	7	2	4.757873223,	8	1.514478084,	8
10	9	7	4	-3.887862119,	10	-1.237544949,	10

N	M	S	R	INTEGRAL		INTEGRAL/Π	
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10	9	8	5	-3.487131648,	11		
10	9	8	7	4.184557978,	13		
10	9	9	0	1.216501676,	6	3.872245101,	5
10	9	9	2	-1.308415136,	8	-4.164814731,	7
10	9	9	4	1.895332783,	10	6.033031625,	9
10	9	9	6	-3.421599010,	12	-1.085945692,	12
10	9	9	8	6.573014092,	14	2.092255367,	14
10	9	10	1	3.801600000,	6		
10	9	10	3	-5.930496000,	8		
10	9	10	5	1.245404160,	11		
10	9	10	7	-3.387499315,	13		
10	9	10	9	1.158524766,	16		
10	10	0	0	4.837248000,	8		
10	10	1	1	4.640059219,	8	1.476976722,	8
10	10	2	0	-1.860480000,	8		
10	10	2	2	1.339545600,	9		
10	10	3	1	-4.474342818,	8	-1.424227553,	8
10	10	3	3	6.462939627,	9	2.057217577,	9
10	10	4	0	7.441920000,	7		
10	10	4	2	-1.786060800,	9		
10	10	4	4	4.375848960,	10		
10	10	5	1	2.446906229,	8	7.788744432,	7
10	10	5	3	-9.896376303,	9	-3.150114415,	9
10	10	5	5	3.821737371 7,	11	1.215044131,	11
10	10	6	0	-2.188800000,	7		
10	10	6	2	1.103155200,	9		
10	10	6	4	-6.949877760,	10		
10	10	6	6	4.077261619,	12		
10	10	7	1	-7.929788705,	7	-2.524130140,	7
10	10	7	3	6.185235189,	9	1.968821509,	9
10	10	7	5	-5.831793179,	11	-1.856317423,	11
10	10	7	7	5.155305170,	13	1.640984602,	13
10	10	8	0	4.032000000,	6		
10	10	8	2	-3.483648000,	8		
10	10	8	4	4.023613440,	10		
10	10	8	6	-5.579410637,	12		
10	10	8	8	7.532204360,	14		
10	10	9	1	1.338151844,	7	4.259469611,	6
10	10	9	3	-1.700939677,	9	-5.414259150,	8
10	10	9	5	2.842999175,	11	9.049547437,	10
10	10	9	7	-5.799718316,	13	-1.846107677,	13
10	10	9	9	1.248872677,	16	3.975285198,	15
10	10	10	0	-3.456000000,	5		
10	10	10	2	4.561920000,	7		
10	10	10	4	-8.302694400,	9		
10	10	10	6	1.992646656,	12		
10	10	10	8	-6.097498767,	14		
10	10	10	10	2.317049532,	17		