

Table 2.

Summation of the large-*D* series for (*n*, 0, 0) states of helium

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shift0 = 2 n1 - 1
shift1 = E1/(2 EO)

Helium asymmetric-configuration state (0, 0, 0)

Ncoef =17 Shift=0 = -1 Shift-1 = -.29 .01

n	1/(D+shift0)-expansion	Padé
0	-.1061633515D+02	-.2116897018D+01
1	-.6253245694D+01	-.1012624162D+01
2	-.6446039424D+02	-.1579541403D+02
3	-.7172947469D+02	-.3718389405D+02
4	-.3327899953D+02	-.4761604130D+02
5	-.3004376541D+04	-.3476867174D+02
6	-.2031700181D+05	-.1549373700D+05
7	-.1022699351D+05	-.185609627D+06
8	-.1625349553D+07	-.6493760061D+06
9	-.1632471716D+08	-.1058234871D+08
10	-.3094847724D+08	-.2125047748D+09
11	-.1441123043D+10	-.1911589425D+10
12	-.2855421176D+11	-.4927998498D+10
13	-.3596535503D+12	-.1894896890D+12
14	-.3743676760D+13	-.5800535122D+13
15	-.2422463974D+14	-.1272199404D+15
16	-.4349108876D+15	-.2443776047D+16
n	1/(D+shift1)-expansion	Padé
1	.1776356839D-14	.1332267630D-14
2	-.6170165292D+02	-.1614000661D+02
3	.1442897004D+03	-.5858462037D+02
4	-.1890415769D+03	.2809976112D+02
5	-.2823872357D+04	-.1903274393D+02
6	.2632844656D+05	.1530631976D+05
7	-.4570708113D+05	-.2196056806D+06
8	-.1562395017D+07	.1181112994D+07
9	.2092540253D+08	.7756283955D+07
10	-.9200237464D+08	-.2402350218D+09
11	-.1200731425D+10	.2700998349D+10
12	.3332709899D+11	-.1385080053D+11
13	-.4852995325D+12	-.1474577399D+12
14	.5617257385D+13	.6486043849D+13
15	-.4695488469D+14	-.1552525299D+15
16	-.2362461555D+15	.3138331127D+16

Helium asymmetric-configuration state (1, 0, 0)

Ncoef =15 Shift=0 = 1 Shift-1 = 2.05 .63

n	1/(D+shift0)-expansion	Padé
0	-.1061633515D+02	-.2116897018D+01
1	.4091403011D+02	.2198002297D+02
2	-.3297783636D+03	-.176738729D+03
3	.4192193328D+04	.1467864869D+04
4	-.5591981034D+05	-.215278399D+05
5	.4703472343D+06	.6201948763D+06
6	.9951027630D+07	-.931727737D+07
7	-.3706553080D+09	-.312515133D+09
8	-.6787906423D+10	-.1432655174D+11
9	.4718655654D+12	.1564108303D+12
10	.4313991571D+13	-.1611376881D+14
11	-.5553477286D+15	-.1123656160D+15
12	-.2958960930D+16	-.1878377428D+17
13	.6326011339D+18	.8194860241D+17
14	.2286753587D+19	-.2120030773D+20
n	1/(D+shift0)-expansion	Padé
0	-.1061633515D+02	-.2116897018D+01
1	.1968135980D+02	.1774623524D+02
2	-.238852787D+03	-.1171444761D+03
3	.3076098714D+04	.8843419655D+03
4	-.3790056871D+05	-.157466377D+05
5	.1916657174D+06	.5098281358D+06
6	.1220511166D+08	-.5382361515D+07
7	-.2807328272D+09	-.3707999828D+09
8	-.9732602036D+10	-.1122814948D+11
9	.3885866592D+12	.2846212083D+12
10	.9073496447D+13	-.1365964643D+14
11	-.4741052427D+15	-.2924173809D+15
12	-.9712349081D+16	.1612070321D+17
13	.5426670009D+18	.3290149841D+18
14	.1121966580D+20	-.1807136513D+20
n	1/(D+shift1)-expansion	Padé
1	.3552713679D-14	.0000000000D+00
2	-.2245003756D+03	-.7066386905D+02
3	.2327192396D+04	-.5235514076D+02
4	-.2491024337D+05	-.5188729477D+04
5	.3108014911D+05	.3299281460D+06
6	.1120103205D+08	-.1899247742D+07
7	.1646145725D+09	-.3411905431D+09
8	.9802758813D+10	.6596621773D+10
9	.2297284630D+12	.3159005256D+12
10	.1052695462D+14	-.8025549192D+13
11	-.2672561898D+15	-.3535786816D+15
12	-.2068665942D+17	.8610294832D+16
13	.2704643698D+18	.4121593778D+18
14	.1400947536D+20	-.8258646180D+19

Helium asymmetric-configuration state (2, 0, 0)

Ncoef =15 Shift=0 = 3 Shift-1 = 4.40 1.24

n	1/(D+shift0)-expansion	Padé
0	-.1061633515D+02	-.2116897018D+01
1	.8808130591D+02	.4497268271D+02
2	-.9574180116D+03	-.7019215329D+03
3	.1736262966D+05	.1077241286D+05

4	-.3657827265D+06	-.1968787473D+06
5	.6430815492D+07	.4782858517D+07
6	-.4915664057D+08	-.1020483972D+09
7	-.1399241534D+10	.3223158137D+09
8	.4991113180D+11	.8162324584D+11
9	.4458200090D+12	-.4241515359D+13
10	-.1306850285D+15	.1147689605D+15
11	.1169266963D+17	.1707637245D+16
12	-.9459333210D+17	-.1242142703D+19
13	-.1212785674D+21	-.2056189983D+20
14	-.8204634645D+22	.8453673347D+22
n	1/(D+shift0)-expansion	Padé
0	-.1061633515D+02	-.2116897018D+01
1	.2438329500D+02	.3227130060D+02
2	-.4513273075D+03	-.3543236080D+03
3	.9483439839D+04	.4549254455D+04
4	-.1720285659D+06	-.8718021133D+05
5	.1765215862D+07	.2365834547D+07
6	.3084625816D+08	.3040977592D+08
7	-.1424469148D+10	-.1166837261D+10
8	.7536058354D+10	.6639053339D+11
9	.1306613423D+13	.1922138733D+13
10	-.9820418617D+14	.1438832966D+14
11	.7487485493D+16	.3800898023D+16
12	.2755353002D+18	-.1123013242D+19
13	-.1169024537D+21	-.7050956014D+20
14	-.1362187938D+23	.6385434078D+22
n	1/(D+shift1)-expansion	Padé
0	.0000000000D+00	.0000000000D+00
1	-.4603696005D+03	-.2413408743D+03
2	.8315225642D+04	.7200714290D+03
3	-.1256098407D+06	-.1357114766D+05
4	.8622093496D+06	.8494950473D+06
5	.3053815614D+08	-.3952759387D+07
6	-.9338155505D+09	-.1036280554D+10
7	.5578297813D+10	.3931417146D+11
8	.7439676977D+12	-.1115984320D+13
9	-.6256854781D+14	.5224645492D+13
10	.6027958883D+16	.2780576047D+16
11	.3444194596D+18	-.9557318492D+18
12	-.9282283525D+20	-.8535179382D+20
13	-.1435667609D+23	.2795402475D+22

Exact 1S -0.2574
Exact 3S -0.2500

Helium asymmetric-configuration state (3, 0, 0)

Ncoef =15 Shift=0 = 5 Shift-1 = 6.74 1.86

n	1/(D+shift0)-expansion	Padé
0	-.1061633515D+02	-.2116897018D+01
1	.1352485817D+03	.6796533614D+02
2	-.1947379338D+04	-.1559767566D+04
3	.4504590860D+05	.3438411104D+05
4	-.1282993824D+07	-.8248968748D+06
5	.3346210146D+08	.2627437106D+08
6	-.6539062478D+09	-.6015698699D+09
7	.5170860342D+10	.9967739147D+10
8	.2883598006D+12	.2357766326D+12
9	-.1250945300D+14	-.3589704451D+14
10	-.5215628047D+15	.2009184250D+16
11	.1047621479D+18	.3496206419D+17
12	-.2919097073D+19	-.6731054163D+19
13	.3530720406D+21	.3459040061D+20
14	-.2825249707D+23	-.0992700092D+22
n	1/(D+shift0)-expansion	Padé
0	-.1061633515D+02	-.2116897018D+01
1	.2908523020D+02	.4679636596D+02
2	-.7148757489D+03	-.6990548002D+03
3	.2107744152D+05	.1232511163D+05
4	-.5078062636D+06	-.2768946234D+06
5	.8064953293D+07	.751957048D+07
6	.5886999403D+07	.1204985092D+09
7	-.4860372153D+10	-.2737517802D+10
8	.1983731493D+12	.3277075133D+12
9	.1430424647D+13	-.1949229648D+14
10	-.8012086524D+15	.4681249064D+15
11	.6115067173D+17	.3471995015D+17
12	-.2562205562D+19	-.6220994775D+19
13	-.3487262900D+21	-.4442362456D+21
14	-.5697573564D+23	-.2533757527D+23
n	1/(D+shift1)-expansion	Padé
0	.0000000000D+00	.7105427358D-14
1	-.7693093276D+03	-.4958910093D+03
2	.2003548630D+05	.2822450121D+04
3	-.3971250789D+06	-.1940280407D+05
4	.4837407758D+07	.9393197868D+06
5	.3548044323D+08	.1274434738D+08
6	-.3976838483D+10	-.3094897705D+10
7	.1831394310D+12	.2073294537D+12
8	-.2318392215D+12	-.1133672497D+14
9	-.4820618579D+15	.1856886568D+15
10	.4103912141D+17	.2740407986D+17
11	-.2946196636D+19	-.4313078070D+19
12	.1455385152D+21	-.4990326955D+21
13	-.5007102071D+23	-.4456088718D+23

Exact 1S -0.14106
Exact 3S -0.14009

Helium asymmetric-configuration state (4, 0, 0)

Ncoef =15 Shift=0 = 7 Shift-1 = 9.08 2.47

n	1/(D+shift0)-expansion	Padé
0	-.1061633515D+02	-.2116897018D+01
1	.1824158575D+03	.9095798957D+02
2	-.3299662343D+04	-.2750271972D+04
3	.9270490031D+05	.7881061034D+05
4	-.3315473848D+07	-.2369052989D+07
5	.1138847052D+09	.7671089083D+08
6	-.3287720729D+10	-.2432675570D+10
7	.6645955022D+11	.5888517672D+11
8	-.1585800730D+12	.2820556438D+12
9	-.7976478646D+14	-.1788324216D+15

11	.4853353825D+21	-.6695463500D+21	-.01314	.00076
12	-.1379500524D+24	-.6629708702D+23	-.01314	.00034
13	.9301396660D+25	.2354636729D+26	-.01394	.00072
14	.1567134201D+28	-.3162676860D+28	-.01316	.00036
n	1/(D+shift1)	-expansion	Padé	
1	.2842170943D-13	.0000000000D+00	-.01036	.00291
2	-.6837939470D+04	-.6561133057D+04	-.01959	.00456
3	.7014390482D+06	.1746112842D+06	-.01309	.00187
4	-.4601427162D+08	.3175983645D+07	-.01305	.00042
5	.2422316448D+10	-.1020422987D+10	-.01321	.00106
6	-.8131106871D+11	.1097799527D+12	-.01310	.00070
7	-.3660535623D+13	-.1125214073D+14	-.01316	.00092
8	.1275182265D+16	.1051176255D+16	-.01318	.00064
9	-.1571804483D+18	-.4916577897D+17	-.01338	.00081
10	.8806591947D+19	-.2102888764D+19	-.01322	.00069
11	.4289850515D+21	.4795466125D+21	-.01331	.00114
12	-.1154634851D+24	-.3761126076D+23	-.01321	.00054
13	.7346995164D+25	.7503421263D+25	-.01362	-.00148
14	.4930259204D+27	-.1122206999D+28	-.01328	.00054
		Exact 1S, 3S	-.01318	