

## *Appendices*

# Physical and Astronomical Constants

Values for most of these constants are those given by Allen [A1 63a].

Solar luminosity	Electronic charge
$L_{\odot} = 3.90 \times 10^{33}$ erg/sec	$e = 4.803 \times 10^{-10}$ e.s.u.
Solar absolute bolometric magnitude	Classical electron radius
$M_{b,\odot} = +4.77$	$e^2/m_e c^2 = 2.818 \times 10^{-13}$ cm
Solar mass	Fine structure constant
$M_{\odot} = 1.989 \times 10^{33}$ gm	$e^2/\hbar c = 1/137.037$
Solar radius	Thomson scattering cross section
$R_{\odot} = 6.960 \times 10^{10}$ cm	$\sigma_0 = (8\pi/3)(e^2/m_e c^2)^2 =$ $0.6652 \times 10^{-24}$ cm <sup>2</sup>
Solar effective temperature	Compton wavelength of the electron
$T_{e,\odot} = 5800^\circ\text{K}$	$\lambda_c = \hbar/m_e c = 3.8615 \times 10^{-11}$ cm
Solar surface gravity	Atomic mass unit (AMU)
$g_{s,\odot} = 2.738 \times 10^4$ cm/sec	1 AMU = $H = 1/N_0 =$ $= 1.6598 \times 10^{-24}$ gm $= 931.1$ Mev
Velocity of light in vacuo	Mass of hydrogen atom
$c = 2.99793 \times 10^{10}$ cm/sec	$H^1 = 1.6733 \times 10^{-24}$ gm $= 1.0081$ AMU
Constant of gravitation	Mass ratio proton/electron
$G = 6.668 \times 10^{-8}$ c.g.s. units	$m_p/m_e = 1836.1$
Boltzmann constant	Electron volt (ev)
$k = 1.3805 \times 10^{-16}$ erg/deg C $= 8.617 \times 10^{-5}$ ev/deg C	1 ev = $1.602 \times 10^{-12}$ erg $= 11.605 \times 10^3$ °K
Avogadro's number (phys. scale)	Stefan-Boltzmann constant
$N_0 = 6.025 \times 10^{23}$	$\sigma = 5.669 \times 10^{-5}$ erg/cm <sup>2</sup> / (deg C) <sup>4</sup> /sec
Gas constant (phys. scale)	Radiation pressure constant
$\mathcal{R} = 8.317 \times 10^7$ erg/deg C/mole	$a = 4\sigma/c =$ $7.564 \times 10^{-15}$ erg/cm <sup>3</sup> /(deg C) <sup>4</sup>
Planck's constant	
$h = 6.625 \times 10^{-27}$ erg sec $\hbar \equiv h/2\pi = 1.0544 \times 10^{-27}$ erg sec	
Electron rest mass	
$m_e = 9.108 \times 10^{-28}$ gm $= 0.5110$ Mev (million electron volts)	

## *Fermi-Dirac Integrals*

Table A.2.1 gives values of the integral  $F_k(\eta, \beta)$ , defined in (24.97), for  $k = (1/2), (3/2)$ , and  $(5/2)$ , and for  $10^{-6} \leq \beta \leq 10^{+4}$ ,  $-30 \leq -\eta \leq +70$ , where  $\eta$  is the degeneracy parameter and  $\beta \equiv kT/mc^2$  ( $k =$  Boltzmann's constant,  $T =$  temperature,  $m =$  electron rest mass,  $c =$  velocity of light in vacuo). Values are also given for  $F_k(-\eta - 2/\beta, \beta)$ , for  $k = (1/2), (3/2)$ , and  $(5/2)$ , for some of the above values of  $\eta$  and  $\beta$ . For convenience, we reproduce here the expression for  $F_k(\eta, \beta)$ :

$$F_k(\eta, \beta) \equiv \int_0^{\infty} \frac{x^k \left(1 + \frac{1}{2}\beta x\right)^{1/2} dx}{e^{-\eta+x} + 1} \quad (k > -1).$$

Some of the entries were evaluated with the help of a computer program kindly made available to us by Terry W. Edwards.

Table A.2.1\*

FERMI-DIRAC INTEGRALS

( $\eta = -30$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	8.2930(-14)	1.2439(-13)	3.1099(-13)	1.0294(-868576)	1.5440(-868576)	3.8593(-868576)
-5	5.930(-5)	8.2930(-14)	1.2440(-13)	3.1099(-13)	1.2023(-86846)	1.8034(-86846)	4.5085(-86846)
-4	5.930(-4)	8.2933(-14)	1.2440(-13)	3.1101(-13)	1.2211(-8673)	1.8317(-8673)	4.5794(-8673)
-3	5.930(-3)	8.2961(-14)	1.2447(-13)	3.1126(-13)	2.4411(-856)	3.6625(-856)	9.1585(-856)
-2	5.930(-2)	8.3240(-14)	1.2517(-13)	3.1369(-13)	1.3155(-74)	1.9782(-74)	4.9577(-74)
-1.5	1.875(-1)	8.3904(-14)	1.2682(-13)	3.1944(-13)	3.2678(-15)	4.9393(-15)	1.2441(-14)
-1	5.930(-1)	8.5950(-14)	1.3186(-13)	3.3684(-13)			
-0.5	1.875(0)	9.1984(-14)	1.4639(-13)	3.8595(-13)			
0	5.930(0)	1.0826(-13)	1.8399(-13)	5.0877(-13)			
+0.5	1.875(+1)	1.4691(-13)	2.6874(-13)	7.7564(-13)			
+1	5.930(+1)	2.2787(-13)	4.3856(-13)	1.2963(-12)			
+1.5	1.875(+2)	3.8327(-13)	7.5578(-13)	2.2559(-12)			
+2	5.930(+2)	6.6816(-13)	1.3300(-12)	3.9833(-12)			
+3	5.930(+3)	2.0945(-12)	4.1869(-12)	1.2559(-11)			
+4	5.930(+4)	6.6175(-12)	1.3234(-11)	3.9702(-11)			

Table A.2.1\* (Continued)

FERMI-DIRAC INTEGRALS

( $\eta = -25$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	1.2308(-11)	1.8462(-11)	4.6155(-11)	6.9359(-868579)	1.0404(-868578)	2.6004(-868678)
-5	5.930(-5)	1.2308(-11)	1.8462(-11)	4.6155(-11)	8.1008(-86849)	1.2151(-86848)	3.0378(-86848)
-4	5.930(-4)	1.2308(-11)	1.8463(-11)	4.6159(-11)	8.2278(-8676)	1.2342(-8675)	3.0856(-8675)
-3	5.930(-3)	1.2312(-11)	1.8473(-11)	4.6195(-11)	1.6448(-858)	2.4678(-858)	6.1710(-858)
-2	5.930(-2)	1.2354(-11)	1.8577(-11)	4.6556(-11)	8.8640(-77)	1.3329(-76)	3.3404(-76)
-1.5	1.875(-1)	1.2452(-11)	1.8822(-11)	4.7410(-11)	2.2018(-17)	3.3281(-17)	8.3830(-17)
-1	5.930(-1)	1.2756(-11)	1.9570(-11)	4.9992(-11)			
-0.5	1.875(0)	1.3652(-11)	2.1726(-11)	5.7280(-11)			
0	5.930(0)	1.6067(-11)	2.7306(-11)	7.5509(-11)			
+0.5	1.875(+1)	2.1804(-11)	3.9885(-11)	1.1511(-10)			
+1	5.930(+1)	3.3819(-11)	6.5089(-11)	1.9239(-10)			
+1.5	1.875(+2)	5.6882(-11)	1.1217(-10)	3.3481(-10)			
+2	5.930(+2)	9.9164(-11)	1.9738(-10)	5.9117(-10)			
+3	5.930(+3)	3.1085(-10)	6.2140(-10)	1.8639(-9)			
+4	5.930(+4)	9.8212(-10)	1.9641(-9)	5.8924(-9)			

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.2.1\* (Continued)

## FERMI-DIRAC INTEGRALS

 $(\eta = -20)$ 

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	1.8267(-9)	2.7400(-9)	6.8499(-9)	4.6734(-868581)	7.0100(-868581)	1.7521(-868580)
-5	5.930(-5)	1.8267(-9)	2.7400(-9)	6.8500(-9)	5.4583(-86851)	8.1874(-86851)	2.0468(-86850)
-4	5.930(-4)	1.8267(-9)	2.7401(-9)	6.8505(-9)	5.5439(-8678)	8.3160(-8678)	2.0790(-8677)
-3	5.930(-3)	1.8273(-9)	2.7417(-9)	6.8559(-9)	1.1082(-8660)	1.6628(-8660)	4.1580(-8660)
-2	5.930(-2)	1.8335(-9)	2.7570(-9)	6.9095(-9)	5.9725(-79)	8.9810(-79)	2.2508(-78)
-1.5	1.875(-1)	1.8481(-9)	2.7934(-9)	7.0362(-9)	1.4836(-19)	2.2424(-19)	5.6484(-19)
-1	5.930(-1)	1.8932(-9)	2.9045(-9)	7.4195(-9)			
-0.5	1.875(0)	2.0261(-9)	3.2245(-9)	8.5011(-9)			
0	5.930(0)	2.3846(-9)	4.0526(-9)	1.1206(-8)			
+0.5	1.875(+1)	3.2359(-9)	5.9195(-9)	1.7085(-8)			
+1	5.930(+1)	5.0192(-9)	9.6600(-9)	2.8554(-8)			
+1.5	1.875(+2)	8.4420(-9)	1.6647(-8)	4.9690(-8)			
+2	5.930(+2)	1.4717(-8)	2.9294(-8)	8.7738(-8)			
+3	5.930(+3)	4.6135(-8)	9.2224(-8)	2.7662(-7)			
+4	5.930(+4)	1.4576(-7)	2.9151(-7)	8.7450(-7)			

Table A.2.1\* (Continued)  
FERMI-DIRAC INTEGRALS  
( $\eta = -15$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	2.7110(-7)	4.0665(-7)	1.0166(-6)	3.1489(-868583)	4.7233(-868583)	1.1806(-868582)
-5	5.930(-5)	2.7110(-7)	4.0665(-7)	1.0166(-6)	3.6778(-86853)	5.5166(-86853)	1.3792(-86852)
-4	5.930(-4)	2.7111(-7)	4.0667(-7)	1.0167(-6)	3.7354(-8680)	5.6033(-8680)	1.4008(-8679)
-3	5.930(-3)	2.7120(-7)	4.0690(-7)	1.0175(-6)	7.4673(-863)	1.1204(-862)	2.8016(-862)
-2	5.930(-2)	2.7211(-7)	4.0918(-7)	1.0255(-6)	4.0243(-81)	6.0513(-81)	1.5166(-80)
-1.5	1.875(-1)	2.7428(-7)	4.1458(-7)	1.0443(-6)	9.9963(-22)	1.5109(-21)	3.8059(-21)
-1	5.930(-1)	2.8097(-7)	4.3106(-7)	1.1011(-6)			
-0.5	1.875(0)	3.0070(-7)	4.7856(-7)	1.2617(-6)			
0	5.930(0)	3.5391(-7)	6.0146(-7)	1.6632(-6)			
+0.5	1.875(+1)	4.8026(-7)	8.7853(-7)	2.5356(-6)			
+1	5.930(+1)	7.4491(-7)	1.4337(-6)	4.2378(-6)			
+1.5	1.875(+2)	1.2529(-6)	2.4707(-6)	7.3746(-6)			
+2	5.930(+2)	2.1842(-6)	4.3476(-6)	1.3021(-5)			
+3	5.930(+3)	6.8470(-6)	1.3687(-5)	4.1055(-5)			
+4	5.930(+4)	2.1633(-5)	4.3263(-5)	1.2979(-4)			

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.2.1\* (Continued)

## FERMI-DIRAC INTEGRALS

 $(\eta = -10)$ 

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	4.0234(-5)	6.0352(-5)	1.5088(-4)	2.1217(-868585)	3.1825(-868585)	7.9546(-868585)
-5	5.930(-5)	4.0234(-5)	6.0352(-5)	1.5088(-4)	2.4780(-86855)	3.7171(-86855)	9.2927(-86855)
-4	5.930(-4)	4.0236(-5)	6.0355(-5)	1.5089(-4)	2.5169(-8682)	3.7755(-8682)	9.4388(-8682)
-3	5.930(-3)	4.0249(-5)	6.0389(-5)	1.5101(-4)	5.0314(-865)	7.5490(-865)	1.8877(-864)
-2	5.930(-2)	4.0384(-5)	6.0727(-5)	1.5219(-4)	2.7115(-83)	4.0774(-83)	1.0218(-82)
-1.5	1.875(-1)	4.0707(-5)	6.1528(-5)	1.5498(-4)	6.7354(-24)	1.1081(-23)	2.5644(-23)
-1	5.930(-1)	4.1699(-5)	6.3974(-5)	1.6342(-4)	4.1699(-5)	6.3974(-5)	1.6342(-4)
-0.5	1.875(0)	4.4627(-5)	7.1024(-5)	1.8725(-4)			
0	5.930(0)	5.2524(-5)	8.9264(-5)	2.4684(-4)			
+0.5	1.875(+1)	7.1275(-5)	1.3038(-4)	3.7631(-4)			
+1	5.930(+1)	1.1055(-4)	2.1277(-4)	6.2894(-4)			
+1.5	1.875(+2)	1.8594(-4)	3.6668(-4)	1.0945(-3)			
+2	5.930(+2)	3.2416(-4)	6.4524(-4)	1.9326(-3)			
+3	5.930(+3)	1.0162(-3)	2.0313(-3)	6.0931(-3)			
+4	5.930(+4)	3.2105(-3)	6.4208(-3)	1.9262(-2)			

Table A.2.1\* (Continued)

FERMI-DIRAC INTEGRALS

( $\eta = -5$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	5.9572(-3)	8.9464(-3)	2.2379(-2)	1.4296(-868587)	2.1444(-868587)	5.3598(-868587)
-5	5.930(-5)	5.9572(-3)	8.9464(-3)	2.2379(-2)	1.6697(-86857)	2.5046(-86857)	6.2613(-86857)
-4	5.930(-4)	5.9574(-3)	8.9469(-3)	2.2381(-2)	1.6959(-8684)	2.5439(-8684)	6.3598(-8684)
-3	5.930(-3)	5.9594(-3)	8.9520(-3)	2.2399(-2)	3.3901(-867)	5.0865(-867)	1.2719(-866)
-2	5.930(-2)	5.9795(-3)	9.0021(-3)	2.2574(-2)	1.8270(-85)	2.7473(-85)	6.8852(-85)
-1.5	1.875(-1)	6.0272(-3)	9.1209(-3)	2.2988(-2)	4.5383(-26)	6.8596(-26)	1.7279(-25)
-1	5.930(-1)	6.1744(-3)	9.4837(-3)	2.4241(-2)	2.8097(-7)	4.3106(-7)	1.1011(-6)
-0.5	1.875(0)	6.6083(-3)	1.0529(-2)	2.7775(-2)			
0	5.930(0)	7.7788(-3)	1.3235(-2)	3.6616(-2)			
+0.5	1.875(+1)	1.0558(-2)	1.9333(-2)	5.5824(-2)			
+1	5.930(+1)	1.6378(-2)	3.1551(-2)	9.3302(-2)			
+1.5	1.875(+2)	2.7549(-2)	5.4374(-2)	1.6237(-1)			
+2	5.930(+2)	4.8029(-2)	9.5682(-2)	2.8670(-1)			
+3	5.930(+3)	1.5056(-1)	3.0123(-1)	9.0391(-1)			
+4	5.930(+4)	4.7569(-1)	9.5214(-1)	2.8576(0)			

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.2.1\* (Continued)

## FERMI-DIRAC INTEGRALS

 $(\eta = 0)$ 

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	6.7809(-1)	1.1528(0)	3.0826(0)	9.6325(-868590)	1.4449(-868589)	3.6114(-868589)
-5	5.930(-5)	6.7810(-1)	1.1528(0)	3.0826(0)	1.1250(-86859)	1.6876(-86859)	4.2189(-86859)
-4	5.930(-4)	6.7812(-1)	1.1529(0)	3.0829(0)	1.1427(-8686)	1.7141(-8686)	4.2852(-8686)
-3	5.930(-3)	6.7838(-1)	1.1536(0)	3.0854(0)	2.2842(-869)	3.4272(-869)	8.5702(-869)
-2	5.930(-2)	6.8097(-1)	1.1605(0)	3.1104(0)	1.2310(-87)	1.8511(-87)	4.6392(-87)
-1.5	1.875(-1)	6.8711(-1)	1.1768(0)	3.1695(0)	3.0579(-28)	4.6220(-28)	1.1642(-27)
-1	5.930(-1)	7.0603(-1)	1.2267(0)	3.3480(0)	1.8932(-9)	2.9045(-9)	7.4195(-9)
-0.5	1.875(0)	7.6156(-1)	1.3700(0)	3.8510(0)	1.7602(-3)	2.8022(-3)	7.3890(-3)
0	5.930(0)	9.1006(-1)	1.7388(0)	5.1049(0)	1.5032(-1)	2.6088(-1)	7.2872(-1)
+0.5	1.875(+1)	1.2584(0)	2.5644(0)	7.8190(0)	7.3170(-1)	1.4292(0)	4.2608(0)
+1	5.930(+1)	1.9798(0)	4.2092(0)	1.3100(+1)	1.6719(0)	3.5048(0)	1.0824(+1)
+1.5	1.875(+2)	3.3540(0)	7.2718(0)	2.2820(+1)	3.1798(0)	6.8637(0)	2.1485(+1)
+2	5.930(+2)	5.8639(0)	1.2808(+1)	4.0306(+1)	5.7659(0)	1.2576(+1)	3.9546(+1)
+3	5.930(+3)	1.8406(+1)	4.0337(+1)	1.2710(+2)	1.8375(+1)	4.0263(+1)	1.2686(+2)
+4	5.930(+4)	5.8162(+1)	1.2750(+2)	4.0180(+2)	5.8152(+1)	1.2748(+2)	4.0173(+2)

Table A.2.1\* (Continued)  
FERMI-DIRAC INTEGRALS  
( $\eta = 5$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	7.8380(0)	2.7802(+1)	1.2749(+2)	6.4903(-868592)	9.7355(-868592)	2.4333(-868591)
-5	5.930(-5)	7.8380(0)	2.7803(+1)	1.2749(+2)	7.5804(-86862)	1.1371(-86861)	2.8426(-86861)
-4	5.930(-4)	7.8387(0)	2.7806(+1)	1.2751(+2)	7.6993(-86889)	1.1549(-86888)	2.8874(-86888)
-3	5.930(-3)	7.8449(0)	2.7834(+1)	1.2766(+2)	1.5391(-871)	2.3092(-871)	5.7746(-871)
-2	5.930(-2)	7.9071(0)	2.8119(+1)	1.2919(+2)	8.2946(-90)	1.2473(-89)	3.1259(-89)
-1.5	1.875(-1)	8.0539(0)	2.8790(+1)	1.3280(+2)	2.0604(-30)	3.1143(-30)	7.8445(-30)
-1	5.930(-1)	8.4977(0)	3.0802(+1)	1.4354(+2)	1.2756(-11)	1.9570(-11)	4.9992(-11)
-0.5	1.875(0)	9.7470(0)	3.6377(+1)	1.7292(+2)	1.1867(-5)	1.8887(-5)	4.9794(-5)
0	5.930(0)	1.2857(+1)	4.9911(+1)	2.4293(+2)	1.0547(-3)	1.7927(-3)	4.9576(-3)
+0.5	1.875(+1)	1.9584(+1)	7.8453(+1)	3.8815(+2)	5.6143(-3)	1.0276(-2)	2.9665(-2)
+1	5.930(+1)	3.2688(+1)	1.3309(+2)	6.6342(+2)	1.3414(-2)	2.5836(-2)	7.6396(-2)
+1.5	1.875(+2)	5.6838(+1)	2.3291(+2)	1.1642(+3)	2.5864(-2)	5.1044(-2)	1.5242(-1)
+2	5.930(+2)	1.0032(+2)	4.1204(+2)	2.0614(+3)	4.7080(-2)	9.3789(-2)	2.8102(-1)
+3	5.930(+3)	3.1625(+2)	1.3001(+3)	6.5070(+3)	1.5026(-1)	3.0063(-1)	9.0211(-1)
+4	5.930(+4)	9.9976(+2)	4.1105(+3)	2.0573(+4)	4.7560(-1)	9.5195(-1)	2.8570(0)

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.2.1\* (Continued)

## FERMI-DIRAC INTEGRALS

 $(\eta - 10)$ 

$\log_{10} \beta$ $(\beta = kT/m_e c^2)$	$T_0 - T(\text{K}) \cdot 10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	2.1345(+1)	1.3427(+2)	1.0347(+3)	4.3731(-868594)	6.5597(-868594)	1.6396(-868593)
-5	5.930(-5)	2.1345(+1)	1.3427(+2)	1.0347(+3)	5.1076(-86864)	7.6615(-86864)	1.9154(-86863)
-4	5.930(-4)	2.1348(+1)	1.3430(+2)	1.0349(+3)	5.1877(-8691)	7.7818(-8689)	1.9455(-8690)
-3	5.930(-3)	2.1378(+1)	1.3453(+2)	1.0369(+3)	1.0370(-873)	1.5560(-873)	3.8909(-873)
-2	5.930(-2)	2.1677(+1)	1.3683(+2)	1.0567(+3)	5.5889(-92)	8.4041(-92)	2.1062(-91)
-1.5	1.875(-1)	2.2376(+1)	1.4219(+2)	1.1028(+3)	1.3883(-32)	2.0984(-32)	5.2856(-32)
-1	5.930(-1)	2.4432(+1)	1.5785(+2)	1.2367(+3)	8.5950(-14)	1.3186(-13)	3.3684(-13)
-0.5	1.875(0)	2.9926(+1)	1.9905(+2)	1.5853(+3)	7.9962(-8)	1.2726(-7)	3.3551(-7)
0	5.930(0)	4.2679(+1)	2.9275(+2)	2.3680(+3)	7.1084(-6)	1.2081(-5)	3.3406(-5)
+0.5	1.875(+1)	6.8686(+1)	4.8049(+2)	3.9209(+3)	3.7868(-5)	6.9272(-5)	1.9993(-4)
+1	5.930(+1)	1.1766(+2)	8.3036(+2)	6.8004(+3)	9.0513(-5)	1.7421(-4)	5.1493(-4)
+1.5	1.875(+2)	2.0660(+2)	1.4627(+3)	1.1994(+4)	1.7455(-4)	3.4420(-4)	1.0274(-3)
+2	5.930(+2)	3.6589(+2)	2.5933(+3)	2.1273(+4)	3.1774(-4)	6.3247(-4)	1.8943(-3)
+3	5.930(+3)	1.1550(+3)	8.1903(+3)	6.7199(+4)	1.0141(-3)	2.0273(-3)	6.0809(-3)
+4	5.930(+4)	3.6519(+3)	2.5897(+4)	2.1248(+5)	3.2099(-3)	6.4195(-3)	1.9258(-2)

Table A.2.1\* (Continued)  
FERMI-DIRAC INTEGRALS  
( $\eta = 15$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	4.8943(+1)	3.5811(+2)	3.9745(+3)	2.9466(-868596)	4.4199(-868596)	1.1047(-868595)
-5	5.930(-5)	3.8944(+1)	3.5812(+2)	3.9746(+3)	3.4415(-86866)	5.1623(-86866)	1.2906(-86865)
-4	5.930(-4)	3.8952(+1)	3.5821(+2)	3.9757(+3)	3.4955(-8693)	5.2433(-8693)	1.3109(-8692)
-3	5.930(-3)	3.9032(+1)	3.5910(+2)	3.9866(+3)	6.9876(-876)	1.0484(-875)	2.6216(-875)
-2	5.930(-2)	3.9826(+1)	3.6790(+2)	4.0943(+3)	3.7658(-94)	5.6626(-94)	1.4191(-93)
-1.5	1.875(-1)	4.1661(+1)	3.8815(+2)	4.3414(+3)	9.3541(-35)	1.4139(-34)	3.5614(-34)
-1	5.930(-1)	4.6928(+1)	4.4579(+2)	5.0407(+3)	5.7913(-16)	8.8848(-16)	2.2696(-15)
-0.5	1.875(0)	6.0408(+1)	5.9100(+2)	6.7849(+3)	5.3878(-10)	8.5746(-10)	2.2606(-9)
0	5.930(0)	9.0273(+1)	9.0673(+2)	1.0537(+4)	4.7896(-8)	8.1399(-8)	2.2509(-7)
+0.5	1.875(+1)	1.4924(+2)	1.5212(+3)	1.7785(+4)	2.5515(-7)	4.6675(-7)	1.3471(-6)
+1	5.930(+1)	2.5853(+2)	2.6513(+3)	3.1070(+4)	6.0988(-7)	1.1738(-6)	3.4696(-6)
+1.5	1.875(+2)	4.5575(+2)	4.6839(+3)	5.4933(+4)	1.1761(-6)	2.3192(-6)	6.9226(-6)
+2	5.930(+2)	8.0818(+2)	8.3120(+3)	9.7508(+4)	2.1410(-6)	4.2616(-6)	1.2764(-5)
+3	5.930(+3)	2.5527(+3)	2.6262(+4)	3.0811(+5)	6.8333(-6)	1.3660(-5)	4.0973(-5)
+4	5.930(+4)	8.0714(+3)	8.3040(+4)	9.7426(+5)	2.1628(-5)	4.3255(-5)	1.2976(-4)

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.2.1\* (Continued)  
FERMI-DIRAC INTEGRALS  
( $\eta = 20$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	5.9813(+1)	7.2657(+2)	1.0591(+4)	1.9854(-868598)	2.9781(-868598)	7.4436(-868598)
-5	5.930(-5)	5.9815(+1)	7.2659(+2)	1.0591(+4)	2.3189(-868668)	3.4783(-868668)	8.6957(-868668)
-4	5.930(-4)	5.9831(+1)	7.2683(+2)	1.0595(+4)	2.3552(-8695)	3.5329(-8695)	8.8325(-8695)
-3	5.930(-3)	5.9994(+1)	7.2921(+2)	1.0633(+4)	4.7082(-878)	7.0640(-878)	1.7664(-877)
-2	5.930(-2)	6.1597(+1)	7.5254(+2)	1.1006(+4)	2.5373(-96)	3.8154(-96)	9.5621(-96)
-1.5	1.875(-1)	6.5262(+1)	8.0561(+2)	1.1851(+4)	6.3028(-37)	9.5266(-37)	2.3996(-36)
-1	5.930(-1)	7.5551(+1)	9.5315(+2)	1.4186(+4)	3.9021(-18)	5.9865(-18)	1.5293(-17)
-0.5	1.875(0)	1.0100(+2)	1.3121(+3)	1.9812(+4)	3.6303(-12)	5.7775(-12)	1.5232(-11)
0	5.930(0)	1.5558(+2)	2.0687(+3)	3.1555(+4)	3.2272(-10)	5.4846(-10)	1.5166(-9)
+0.5	1.875(+1)	2.6123(+2)	3.5149(+3)	5.3868(+4)	1.7192(-9)	3.1449(-9)	9.0768(-9)
+1	5.930(+1)	4.5530(+2)	6.1548(+3)	9.4491(+4)	4.1093(-9)	7.9090(-9)	2.3378(-8)
+1.5	1.875(+2)	8.0431(+2)	1.0891(+4)	1.6729(+5)	7.9246(-9)	1.5627(-8)	4.6644(-8)
+2	5.930(+2)	1.4273(+3)	1.9336(+4)	2.9707(+5)	1.4426(-8)	2.8714(-8)	8.6001(-8)
+3	5.930(+3)	4.5094(+3)	6.1104(+4)	9.3888(+5)	4.6043(-8)	9.2039(-8)	2.7607(-7)
+4	5.930(+4)	1.4259(+4)	1.9322(+5)	2.9688(+6)	1.4573(-7)	2.9145(-7)	8.7433(-7)

Table A.2.1\* (Continued)

## FERMI-DIRAC INTEGRALS

 $(\eta = 25)$ 

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	8.3498(+1)	1.2623(+3)	2.2836(+4)	1.3378(-868600)	2.0066(-868600)	5.0155(-868600)
-5	5.930(-5)	8.3501(+1)	1.2624(+3)	2.2837(+4)	1.5624(-86870)	2.3437(-86870)	5.8591(-86870)
-4	5.930(-4)	8.3530(+1)	1.2629(+3)	2.2847(+4)	1.5869(-8697)	2.3805(-8697)	5.9513(-8697)
-3	5.930(-3)	8.3813(+1)	1.2680(+3)	2.2949(+4)	3.1724(-880)	4.7597(-880)	1.1902(-879)
-2	5.930(-2)	8.6586(+1)	1.3181(+3)	2.3938(+4)	1.7096(-98)	2.5708(-98)	6.4429(-98)
-1.5	1.875(-1)	9.2857(+1)	1.4307(+3)	2.6157(+4)	4.2468(-39)	6.4190(-39)	1.6169(-38)
-1	5.930(-1)	1.1011(+2)	1.7371(+3)	3.2154(+4)	2.6292(-20)	4.0337(-20)	1.0304(-19)
-0.5	1.875(0)	1.5163(+2)	2.4621(+3)	4.6200(+4)	2.4460(-14)	3.8929(-14)	1.0263(-13)
0	5.930(0)	2.3859(+2)	3.9554(+3)	7.4880(+4)	2.1745(-12)	3.6955(-12)	1.0219(-11)
+0.5	1.875(+1)	4.0467(+2)	6.7760(+3)	1.2877(+5)	1.1584(-11)	2.1190(-11)	6.1159(-11)
+1	5.930(+1)	7.0798(+2)	1.1900(+4)	2.2647(+5)	2.7688(-11)	5.3290(-11)	1.5752(-10)
+1.5	1.875(+2)	1.2523(+3)	2.1077(+4)	4.0129(+5)	5.3395(-11)	1.0529(-10)	3.1429(-10)
+2	5.930(+2)	2.2231(+3)	3.7432(+4)	7.1280(+5)	9.7200(-11)	1.9347(-10)	5.7947(-10)
+3	5.930(+3)	7.0251(+3)	1.1831(+5)	2.2530(+6)	3.1023(-10)	6.2016(-10)	1.8602(-9)
+4	5.930(+4)	2.2214(+4)	3.7410(+5)	7.1243(+6)	9.8193(-10)	1.9638(-9)	5.8912(-9)

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.2.1\* (Continued)

FERMI-DIRAC INTEGRALS

 $(\eta = 30)$ 

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	1.0970(+2)	1.9853(+3)	4.2930(+4)	9.0137(-868603)	1.3521(-868602)	3.3794(-868602)
-5	5.930(-5)	1.0970(+2)	1.9854(+3)	4.2932(+4)	1.0528(-86872)	1.5792(-86872)	3.9478(-86872)
-4	5.930(-4)	1.0974(+2)	1.9864(+3)	4.2955(+4)	1.0693(-8699)	1.6040(-8699)	4.0100(-8699)
-3	5.930(-3)	1.1019(+3)	1.9960(+3)	4.3182(+4)	2.1375(-882)	3.2071(-882)	8.0197(-881)
-2	5.930(-2)	1.1453(+2)	2.0896(+3)	4.5391(+4)	1.1520(-100)	1.7322(-100)	4.3412(-100)
-1.5	1.875(-1)	1.2425(+2)	2.2980(+3)	5.0287(+4)	2.8614(-41)	4.3251(-41)	1.0894(-40)
-1	5.930(-1)	1.5052(+2)	2.8544(+3)	6.3267(+4)	1.7716(-22)	2.7179(-22)	6.9429(-22)
-0.5	1.875(0)	2.1226(+2)	4.1403(+3)	9.2971(+4)	1.6481(-16)	2.6230(-16)	6.9153(-16)
0	5.930(0)	3.3929(+2)	6.7437(+3)	1.5262(+5)	1.4652(-14)	2.4900(-14)	6.8855(-14)
+0.5	1.875(+1)	5.7954(+2)	1.1619(+4)	2.6382(+5)	7.8052(-14)	1.4278(-13)	4.1208(-13)
+1	5.930(+1)	1.0166(+3)	2.0446(+4)	4.6479(+5)	1.8656(-13)	3.5907(-13)	1.0614(-12)
+1.5	1.875(+2)	1.7997(+3)	3.6236(+4)	8.2406(+5)	3.5978(-13)	7.0946(-13)	2.1176(-12)
+2	5.930(+2)	3.1957(+3)	6.4369(+4)	1.4640(+6)	6.5493(-13)	1.3036(-12)	3.9044(-12)
+3	5.930(+3)	1.0100(+4)	2.0346(+5)	4.6278(+6)	2.0903(-12)	4.1786(-12)	1.2534(-11)
+4	5.930(+4)	3.1936(+4)	6.4338(+5)	1.4634(+7)	6.6162(-12)	1.3232(-11)	3.9694(-11)

Table A.2.1\* (Continued)

## FERMI-DIRAC INTEGRALS

 $(\eta = 35)$ 

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1,2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3,2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5,2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	1.3818(+2)	2.9135(+3)	7.3325(+4)	6.0734(-868605)	9.1101(-868605)	2.2770(-868604)
-5	5.930(-5)	1.3819(+2)	2.9137(+3)	7.3329(+4)	7.0935(-86875)	1.0640(-86874)	2.6600(-86874)
-4	5.930(-4)	1.3825(+2)	2.9153(+3)	7.3375(+4)	7.2047(-8702)	1.0807(-8701)	2.7019(-8701)
-3	5.930(-3)	1.3891(+2)	2.9317(+3)	7.3826(+4)	1.4402(-884)	2.1609(-884)	5.4036(-883)
-2	5.930(-2)	1.4525(+2)	3.0909(+3)	7.8191(+4)	7.7618(-103)	1.1672(-102)	2.9251(-102)
-1.5	1.875(-1)	1.5931(+2)	3.4414(+3)	8.7762(+4)	1.9280(-43)	2.9142(-43)	7.3406(-43)
-1	5.930(-1)	1.9669(+2)	4.3614(+3)	1.1269(+5)	1.1937(-24)	1.8313(-24)	4.6781(-24)
-0.5	1.875(0)	2.8288(+2)	6.4462(+3)	1.6864(+5)	1.1105(-18)	1.7673(-18)	4.6595(-18)
0	5.930(0)	4.5768(+2)	1.0610(+4)	2.7954(+5)	9.8722(-17)	1.6778(-16)	4.6394(-16)
+0.5	1.875(+1)	7.8586(+2)	1.8358(+4)	4.8504(+5)	5.2591(-16)	9.6204(-16)	2.7766(-15)
+1	5.930(+1)	1.3810(+3)	3.2352(+4)	8.5563(+5)	1.2571(-15)	2.4194(-15)	7.1513(-15)
+1.5	1.875(+2)	2.4464(+3)	5.7364(+4)	1.5176(+6)	2.4242(-15)	4.7803(-15)	1.4269(-14)
+2	5.930(+2)	4.3451(+3)	1.0191(+5)	2.6966(+6)	4.4129(-15)	8.7837(-15)	2.6308(-14)
+3	5.930(+3)	1.3733(+4)	3.2216(+5)	8.5245(+6)	1.4084(-14)	2.8155(-14)	8.4451(-14)
+4	5.930(+4)	4.3427(+4)	1.0187(+6)	2.6956(+7)	4.4579(-14)	8.9154(-14)	2.6746(-13)

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.2.1\* (Continued)

## FERMI-DIRAC INTEGRALS

 $(\eta = 40)$ 

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	1.6879(+2)	4.0633(+3)	1.1669(+5)	4.0922(-868607)	6.1383(-868607)	1.5342(-868606)
-5	5.930(-5)	1.6880(+2)	4.0636(+3)	1.1670(+5)	4.7795(-86877)	7.1693(-86877)	1.7923(-87876)
-4	5.930(-4)	1.6889(+2)	4.0662(+3)	1.1678(+5)	4.8545(-8704)	7.2819(-8704)	1.8205(-8703)
-3	5.930(-3)	1.6980(+2)	4.0924(+3)	1.1760(+5)	9.7043(-887)	1.4560(-886)	3.6409(-886)
-2	5.930(-2)	1.7860(+2)	4.3445(+3)	1.2548(+5)	5.2299(-105)	7.8642(-105)	1.9709(-104)
-1.5	1.875(-1)	1.9795(+2)	4.8941(+3)	1.4259(+5)	1.2991(-45)	1.9636(-45)	4.9460(-45)
-1	5.930(-1)	2.4861(+2)	6.3143(+3)	1.8644(+5)	8.0429(-27)	1.2339(-26)	3.1521(-26)
-0.5	1.875(0)	2.6348(+2)	9.4794(+3)	2.8322(+5)	7.4825(-21)	1.1908(-20)	3.1396(-20)
0	5.930(0)	5.9375(+2)	1.5732(+4)	4.7305(+5)	6.6518(-19)	1.1305(-18)	3.1260(-18)
+0.5	1.875(+1)	1.0236(+3)	2.7307(+4)	8.2319(+5)	3.5436(-18)	6.4822(-18)	1.8709(-17)
+1	5.930(+1)	1.8014(+3)	4.8176(+4)	1.4536(+6)	8.4700(-18)	1.6302(-17)	4.8185(-17)
+1.5	1.875(+2)	3.1926(+3)	8.5453(+4)	2.5790(+6)	1.6334(-17)	3.2210(-17)	9.6141(-17)
+2	5.930(+2)	5.6713(+3)	1.5184(+5)	4.5829(+6)	2.9734(-17)	5.9184(-17)	1.7726(-16)
+3	5.930(+3)	1.7926(+4)	4.7999(+5)	1.4488(+7)	9.4901(-17)	1.8971(-16)	5.6903(-16)
+4	5.930(+4)	5.6685(+4)	1.5178(+6)	4.5814(+7)	3.0037(-16)	6.0072(-16)	1.8021(-15)



Table A.2.1\* (Continued)

## FERMI-DIRAC INTEGRALS

 $(\eta = 50)$ 

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	2.3582(+2)	7.0886(+3)	2.5400(+5)	1.8579(-868611)	2.7868(-868611)	6.9654(-868611)
-5	5.930(-5)	2.3584(+2)	7.0891(+3)	2.5402(+5)	2.1699(-86881)	3.2549(-86881)	8.1371(-86881)
-4	5.930(-4)	2.3600(+2)	7.0949(+3)	2.5424(+5)	2.2039(-8708)	3.3060(-8708)	8.2651(-8708)
-3	5.930(-3)	2.3758(+2)	7.1517(+3)	2.5646(+5)	4.4058(-891)	6.6103(-891)	1.6530(-890)
-2	5.930(-2)	2.5282(+2)	7.6953(+3)	2.7764(+5)	2.3744(-109)	3.5703(-109)	8.9478(-109)
-1.5	1.875(-1)	2.8569(+2)	8.8584(+3)	3.2272(+5)	5.8979(-50)	8.9147(-50)	2.2455(-49)
-1	5.930(-1)	2.6953(+2)	1.1782(+4)	4.3510(+5)	3.6515(-31)	5.6020(-31)	1.4310(-30)
-0.5	1.875(0)	5.5458(+2)	1.8125(+4)	6.7658(+5)	3.3970(-25)	5.4063(-25)	1.4254(-24)
0	5.930(0)	9.1894(+2)	3.0448(+4)	1.1427(+6)	3.0199(-23)	5.1323(-23)	1.4192(-22)
+0.5	1.875(+1)	1.5934(+3)	5.3095(+4)	1.9968(+6)	1.6088(-22)	2.9429(-22)	8.4937(-22)
+1	5.930(+1)	2.8099(+3)	9.3817(+4)	3.5308(+6)	3.8454(-22)	7.4009(-22)	2.1876(-21)
+1.5	1.875(+2)	4.9833(+3)	1.6649(+5)	6.2674(+6)	7.4155(-22)	1.4623(-21)	4.3648(-21)
+2	5.930(+2)	8.8540(+3)	2.9588(+5)	1.1139(+7)	1.3499(-21)	2.6870(-21)	8.0476(-21)
+3	5.930(+3)	2.7989(+3)	9.3540(+5)	3.5216(+7)	4.3085(-21)	8.6127(-21)	2.5834(-20)
+4	5.930(+4)	8.8505(+4)	2.9579(+6)	1.1136(+8)	1.3637(-20)	2.7273(-20)	8.1816(-20)

Table A.2.1\* (Continued)  
FERMI-DIRAC INTEGRALS  
( $\eta = 55$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	2.7204(+2)	8.9920(+3)	3.5422(+5)	1.2518(-868613)	1.8777(-868613)	4.6933(-868613)
-5	5.930(-5)	2.7206(+2)	8.9928(+3)	3.5425(+5)	1.4621(-86883)	2.1931(-86883)	5.4828(-86883)
-4	5.930(-4)	2.7226(+2)	9.0007(+3)	3.5459(+5)	1.4850(-8710)	2.2276(-8710)	5.5690(-8710)
-3	5.930(-3)	2.7428(+2)	9.0800(+3)	3.5799(+5)	2.9686(-893)	4.4540(-893)	1.1138(-892)
-2	5.930(-2)	2.9352(+2)	9.8346(+3)	3.9031(+5)	1.5998(-111)	2.4057(-111)	6.0290(-111)
-1.5	1.875(-1)	3.3469(+2)	1.1435(+4)	4.5844(+5)	3.9740(-52)	6.0066(-52)	1.5130(-51)
-1	5.930(-1)	4.3851(+2)	1.5410(+4)	6.2622(+5)	2.4603(-33)	3.7746(-33)	9.6422(-33)
-0.5	1.875(0)	6.6506(+2)	2.3936(+4)	9.8283(+5)	2.2889(-27)	3.6427(-27)	9.6040(-27)
0	5.930(0)	1.1081(+3)	4.0396(+4)	1.6670(+6)	2.0348(-25)	3.4581(-25)	9.5626(-25)
+0.5	1.875(+1)	1.9255(+3)	7.0561(+4)	2.9174(+6)	1.0840(-24)	1.9829(-24)	5.7230(-24)
+1	5.930(+1)	3.3980(+3)	1.2475(+5)	5.1612(+6)	2.5910(-24)	4.9867(-24)	1.4740(-23)
+1.5	1.875(+2)	6.0277(+3)	2.2143(+5)	9.1629(+6)	4.9965(-24)	9.8530(-24)	2.9410(-23)
+2	5.930(+2)	1.0710(+4)	3.9354(+5)	1.6286(+7)	9.0956(-24)	1.8104(-23)	5.4224(-23)
+3	5.930(+3)	3.3858(+4)	1.2442(+6)	5.1489(+7)	2.9030(-23)	5.8032(-23)	1.7407(-22)
+4	5.930(+4)	1.0707(+5)	3.9343(+6)	1.6282(+8)	9.1885(-23)	1.8376(-22)	5.5127(-22)

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.2.1\* (Continued)

## FERMI-DIRAC INTEGRALS

 $(\eta = 60)$ 

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	3.0995(+2)	1.1173(+4)	4.7995(+5)	8.4347(-868616)	1.2652(-868615)	3.1623(-868615)
-5	5.930(-5)	3.0997(+2)	1.1174(+4)	4.8000(+5)	9.8514(-86886)	1.4777(-86885)	3.6942(-86885)
-4	5.930(-4)	3.1022(+2)	1.1185(+4)	4.8051(+5)	1.0006(-8712)	1.5009(-8712)	3.7524(-8712)
-3	5.930(-3)	3.1272(+2)	1.1293(+4)	4.8553(+5)	2.0002(-895)	3.0011(-895)	7.5045(-895)
-2	5.930(-2)	3.3653(+2)	1.2310(+4)	5.3304(+5)	1.0780(-113)	1.6209(-113)	4.0623(-113)
-1.5	1.875(-1)	3.8708(+2)	1.4451(+4)	6.3234(+5)	2.6776(-54)	4.0472(-54)	1.0194(-53)
-1	5.930(-1)	5.1314(+2)	1.9707(+4)	8.7408(+5)	1.6578(-35)	2.5433(-35)	6.4969(-35)
-0.5	1.875(0)	7.8551(+2)	3.0872(+4)	1.3829(+6)	1.5422(-29)	2.4545(-29)	6.4711(-29)
0	5.930(0)	1.3149(+2)	5.2305(+4)	2.3540(+6)	1.3710(-27)	2.3301(-27)	6.4432(-27)
+0.5	1.875(+1)	2.2890(+3)	9.1496(+4)	4.1250(+6)	7.3038(-27)	1.3361(-26)	3.8561(-26)
+1	5.930(+1)	4.0419(+3)	1.6184(+5)	7.3007(+6)	1.7458(-26)	3.3600(-26)	9.9317(-26)
+1.5	1.875(+2)	7.1715(+3)	2.8731(+5)	1.2963(+7)	3.3666(-26)	6.6389(-26)	1.9816(-25)
+2	5.930(+2)	1.2744(+4)	5.1064(+5)	2.3041(+7)	6.1286(-26)	1.2199(-25)	3.6536(-25)
+3	5.930(+3)	4.0287(+4)	1.6144(+6)	7.2848(+7)	1.9560(-25)	3.9102(-25)	1.1728(-24)
+4	5.930(+4)	1.2740(+5)	5.1051(+6)	2.3036(+8)	6.1912(-25)	1.2382(-24)	3.7144(-24)

Table A.2.1\* (Continued)  
FERMI-DIRAC INTEGRALS  
( $\eta = 65$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	3.4947(+2)	1.3645(+4)	6.3476(+5)	5.6833(-868618)	8.5249(-868618)	2.1307(-868617)
-5	5.930(-5)	3.4950(+2)	1.3647(+4)	6.3484(+5)	6.6378(-86888)	9.9567(-86888)	2.4892(-86887)
-4	5.930(-4)	3.4981(+2)	1.3661(+4)	6.3556(+5)	6.7419(-8715)	1.0114(-8714)	2.5283(-8714)
-3	5.930(-3)	3.5286(+2)	1.3803(+4)	6.4275(+5)	1.3477(-897)	2.0221(-897)	5.0572(-897)
-2	5.930(-2)	3.8181(+2)	1.5143(+4)	7.1046(+5)	7.2632(-116)	1.0922(-115)	2.7372(-115)
-1.5	1.875(-1)	4.4281(+2)	1.7938(+4)	8.5080(+5)	1.8042(-56)	2.7270(-56)	6.8690(-56)
-1	5.930(-1)	5.9342(+2)	2.4731(+4)	1.1889(+6)	1.1170(-37)	1.7136(-37)	4.3776(-37)
-0.5	1.875(0)	9.1590(+2)	2.9033(+4)	1.8943(+6)	1.0392(-31)	1.6538(-31)	4.3602(-31)
0	5.930(0)	1.5393(+3)	6.6354(+4)	3.2345(+6)	9.2380(-30)	1.5700(-29)	4.3414(-29)
+0.5	1.875(+1)	2.6839(+3)	1.1621(+5)	5.6741(+6)	4.9213(-29)	9.0024(-29)	2.5982(-28)
+1	5.930(+1)	4.7418(+3)	2.0564(+5)	1.0046(+7)	1.1763(-28)	2.2640(-28)	6.6920(-28)
+1.5	1.875(+2)	8.4147(+3)	2.6512(+5)	1.7840(+7)	2.2684(-28)	4.4732(-28)	1.3352(-27)
+2	5.930(+2)	1.4954(+4)	6.4896(+5)	3.1710(+7)	4.1294(-28)	8.2195(-28)	2.4618(-27)
+3	5.930(+3)	4.7275(+4)	2.0518(+6)	1.0026(+8)	1.3180(-27)	2.6346(-27)	7.9026(-27)
+4	5.930(+4)	1.4949(+5)	6.4881(+6)	3.1703(+8)	4.1716(-27)	8.3427(-27)	2.5028(-26)

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.2.1\* (Continued)

FERMI-DIRAC INTEGRALS

 $(\eta = 70)$ 

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$F_{1/2}(\eta, \beta)$	$F_{3/2}(\eta, \beta)$	$F_{5/2}(\eta, \beta)$	$F_{1/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{3/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$	$F_{5/2}\left(-\eta - \frac{2}{\beta}, \beta\right)$
-6	5.930(-6)	3.9054(+2)	1.6419(+4)	8.2235(+5)	3.8294(-868620)	5.7440(-868620)	1.4357(-868619)
-5	5.930(-5)	3.9058(+2)	1.6421(+4)	8.2245(+5)	4.4725(-86890)	6.7088(-86890)	1.6772(-86889)
-4	5.930(-4)	3.9095(+2)	1.6440(+4)	8.2346(+5)	4.5426(-8717)	6.8141(-8717)	1.7036(-8716)
-3	5.930(-3)	3.9462(+2)	1.6623(+4)	8.3348(+5)	9.0809(-900)	1.3625(-899)	3.4070(-899)
-2	5.930(-2)	4.2932(+2)	1.8352(+4)	9.2748(+5)	4.8939(-118)	7.3590(-118)	1.8443(-117)
-1.5	1.875(-1)	5.0187(+2)	2.1928(+4)	1.1207(+6)	1.2156(-58)	1.8374(-58)	4.6283(-58)
-1	5.930(-1)	6.7935(+2)	3.0537(+4)	1.5816(+6)	7.5262(-40)	1.1546(-39)	2.9496(-39)
-0.5	1.875(0)	1.0562(+3)	4.8517(+4)	2.5360(+6)	7.0018(-34)	1.1143(-33)	2.9379(-33)
0	5.930(0)	1.7815(+3)	8.2719(+4)	4.3417(+6)	6.2245(-32)	1.0578(-31)	2.9252(-31)
+0.5	1.875(+1)	3.1103(+3)	1.4503(+5)	7.6236(+6)	3.3159(-31)	6.0658(-31)	1.7507(-30)
+1	5.930(+1)	5.4976(+3)	2.5672(+5)	1.3502(+7)	7.9259(-31)	1.5254(-30)	4.5090(-30)
+1.5	1.875(+2)	9.7574(+3)	4.5585(+5)	2.3979(+7)	1.5285(-30)	3.0140(-30)	8.9965(-30)
+2	5.930(+2)	1.7341(+4)	8.1026(+5)	4.2623(+7)	2.7824(-30)	5.5382(-30)	1.6587(-29)
+3	5.930(+3)	5.4822(+4)	2.5618(+6)	1.3476(+8)	8.8805(-30)	1.7752(-29)	5.3247(-29)
+4	5.930(+4)	1.7336(+5)	8.1009(+6)	4.2615(+8)	2.8108(-29)	5.6213(-29)	1.6864(-28)

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

## Ideal Fermi-Dirac Equation of State, ELECTRON-POSITRON PAIRS NEGLECTED

Table A.3.1 gives values of electron density  $n_e$ ,  $\rho/\mu_e$  ( $\rho$  = mass density,  $\mu_e$  = mean molecular weight per free electron, see Sect. 24.3),  $P_e/n_e kT$  ( $P_e$  = electron pressure,  $k$  = Boltzmann's constant,  $T$  = temperature),  $u_e/(3n_e kT/2)$  ( $u_e$  = translational electron kinetic energy per unit volume), and  $P_e/u_e$  for an electron gas obeying the ideal Fermi-Dirac equation of state, with electron-positron pairs neglected, for  $10^{-6} \leq \beta \leq 10^4$  and  $-30 \leq \eta \leq +70$ , where  $\eta$  is the degeneracy parameter and  $\beta = kT/mc^2$  ( $m$  = electron rest mass,  $c$  = velocity of light in vacuo). These quantities were computed from (24.98), (24.99), and (24.100), which we reproduce here for convenience (see also (24.326), (24.327), (24.328), and (24.143)):

$$n_e = \frac{8\pi\sqrt{2}}{h^3} m^3 c^3 \beta^{3/2} [F_{1/2}(\eta, \beta) + \beta F_{3/2}(\eta, \beta)],$$

$$P_e = \frac{16\pi\sqrt{2}}{3h^3} m^4 c^5 \beta^{5/2} [F_{3/2}(\eta, \beta) + (1/2)\beta F_{5/2}(\eta, \beta)],$$

$$u_e = \frac{8\pi\sqrt{2}}{h^3} m^4 c^5 \beta^{5/2} [F_{3/2}(\eta, \beta) + \beta F_{5/2}(\eta, \beta)],$$

where  $h$  is Planck's constant.

Table A.3.1  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = -30$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/\mu_e$
-6	5.930(-6)	2.064(8)	3.425(-16)	1.000	1.000	0.6667
-5	5.930(-5)	6.526(9)	1.083(-14)	1.000	1.000	.6667
-4	5.930(-4)	2.064(11)	3.426(-13)	1.000	1.000	.6666
-3	5.930(-3)	6.538(12)	1.085(-11)	1.000	1.001	.6658
-2	5.930(-2)	2.103(14)	3.490(-10)	1.000	1.012	.6585
-1.5	1.875(-1)	1.230(15)	2.042(-9)	1.000	1.038	.6421
-1	5.930(-1)	7.802(15)	1.295(-8)	1.000	1.113	.5988
-0.5	1.875(0)	6.119(16)	1.016(-7)	1.000	1.294	.5151
0	5.930(0)	7.273(17)	1.207(-6)	1.000	1.580	.4219
+0.5	1.875(+1)	1.395(19)	2.315(-5)	1.000	1.820	.3662
+1	5.930(+1)	3.631(20)	6.026(-4)	1.000	1.937	.3442
+1.5	1.875(+2)	1.075(22)	1.784(-2)	1.000	1.979	.3368
+2	5.930(+2)	3.326(23)	5.521(-1)	1.000	1.993	.3344
+3	5.930(+3)	3.296(26)	5.472(+2)	1.000	1.999	.3334
+4	5.930(+4)	3.294(29)	5.466(+5)	1.000	2.000	0.3333

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = -25$ )

$\log_{10}\beta$	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$\mu_e/(3n_e kT/2)$	$P_e/\mu_e$
-6	5.930(-6)	3.063(10)	5.084(-14)	1.000	1.000	0.6667
-5	5.930(-5)	9.686(11)	1.608(-12)	1.000	1.000	.6667
-4	5.930(-4)	3.063(13)	5.084(-11)	1.000	1.000	.6666
-3	5.930(-3)	9.703(14)	1.611(-9)	1.000	1.001	.6658
-2	5.930(-2)	3.121(16)	5.180(-8)	1.000	1.012	.6585
-1.5	1.875(-1)	1.826(17)	3.030(-7)	1.000	1.038	.6421
-1	5.930(-1)	1.158(18)	1.922(-6)	1.000	1.113	.5988
-0.5	1.875(0)	9.082(18)	1.507(-5)	1.000	1.294	.5151
0	5.930(0)	1.079(20)	1.792(-4)	1.000	1.580	.4219
+0.5	1.875(+1)	2.070(21)	3.436(-3)	1.000	1.820	.3662
+1	5.930(+1)	5.388(22)	8.943(-2)	1.000	1.937	.3442
+1.5	1.875(+2)	1.595(24)	2.647(0)	1.000	1.979	.3368
+2	5.930(+2)	4.937(25)	8.194(+1)	1.000	1.993	.3344
+3	5.930(+3)	4.893(28)	8.121(+4)	1.000	1.999	.3334
+4	5.930(+4)	4.888(31)	8.113(+7)	1.000	2.000	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*

( $\eta = -20$ )

$\log_{10}\beta$	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e k T$	$\mu_e/(3n_e k T/2)$	$P_e/\mu_e$
-6	5.930(-6)	4.546(12)	7.545(-12)	1.000	1.000	0.6667
-5	5.930(-5)	1.438(14)	2.386(-10)	1.000	1.000	.6667
-4	5.930(-4)	4.546(15)	7.546(-9)	1.000	1.000	.6666
-3	5.930(-3)	1.440(17)	2.390(-7)	1.000	1.001	.6658
-2	5.930(-2)	4.631(18)	7.687(-6)	1.000	1.012	.6585
-1.5	1.875(-1)	2.710(19)	4.498(-5)	1.000	1.038	.6421
-1	5.930(-1)	1.718(20)	2.852(-4)	1.000	1.113	.5988
-0.5	1.875(0)	1.348(21)	2.237(-3)	1.000	1.294	.5151
0	5.930(0)	1.602(22)	2.659(-2)	1.000	1.580	.4219
+0.5	1.875(+1)	3.072(23)	5.100(-1)	1.000	1.820	.3662
+1	5.930(+1)	7.997(24)	1.327(+1)	1.000	1.937	.3442
+1.5	1.875(+2)	2.367(26)	3.929(+2)	1.000	1.979	.3368
+2	5.930(+2)	7.327(27)	1.216(+4)	1.000	1.993	.3344
+3	5.930(+3)	7.261(30)	1.205(+7)	1.000	1.999	.3334
+4	5.930(+4)	7.255(33)	1.204(+10)	1.000	2.000	0.3333

Table A.3.1 (Continued)

IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
( $\eta = -15$ )

$\log_{10}\beta$	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	6.746(14)	1.120(-9)	1.000	1.000	0.6667
-5	5.930(-5)	2.133(16)	3.541(-8)	1.000	1.000	.6667
-4	5.930(-4)	6.748(17)	1.120(-6)	1.000	1.000	.6666
-3	5.930(-3)	2.137(19)	3.548(-5)	1.000	1.001	.6658
-2	5.930(-2)	6.873(20)	1.141(-3)	1.000	1.012	.6585
-1.5	1.875(-1)	4.022(21)	6.675(-3)	1.000	1.038	.6421
-1	5.930(-1)	2.550(22)	4.233(-2)	1.000	1.113	.5988
-0.5	1.875(0)	2.000(23)	3.320(-1)	1.000	1.294	.5151
0	5.930(0)	2.377(24)	3.946(0)	1.000	1.580	.4219
+0.5	1.875(+1)	4.560(25)	7.568(+1)	1.000	1.820	.3662
+1	5.930(+1)	1.187(27)	1.970(+3)	1.000	1.937	.3442
+1.5	1.875(+2)	3.513(28)	5.831(+4)	1.000	1.979	.3368
+2	5.930(+2)	1.087(30)	1.805(+6)	1.000	1.993	.3344
+3	5.930(+3)	1.078(33)	1.789(+9)	1.000	1.999	3334
+4	5.930(+4)	1.077(36)	1.787(+12)	1.000	2.000	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = -10$ )

$\log_{10}\beta$	$(\beta = kT/m_e c^2)$	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/\mu_e$
-6	5.930(-6)	1.001(17)	1.662(-7)	1.000	1.000	1.000	0.6667
-5	5.930(-5)	3.166(18)	5.255(-6)	1.000	1.000	1.000	.6667
-4	5.930(-4)	1.001(20)	1.662(-4)	1.000	1.000	1.000	.6666
-3	5.930(-3)	3.172(21)	5.265(-3)	1.000	1.000	1.001	.6658
-2	5.930(-2)	1.020(23)	1.693(-1)	1.000	1.000	1.012	.6585
-1.5	1.875(-1)	5.969(23)	9.907(-1)	1.000	1.000	1.038	.6421
-1	5.930(-1)	3.785(24)	6.282(0)	1.000	1.000	1.113	.5988
-0.5	1.875(0)	2.969(25)	4.928(+1)	1.000	1.000	1.294	.5151
0	5.930(0)	3.528(26)	5.856(+2)	1.000	1.000	1.580	.4219
+0.5	1.875(+1)	6.767(27)	1.123(+4)	1.000	1.000	1.820	.3662
+1	5.930(+1)	1.761(29)	2.924(+5)	1.000	1.000	1.937	.3442
+1.5	1.875(+2)	5.214(30)	8.654(+6)	1.000	1.000	1.979	.3368
+2	5.930(+2)	1.614(32)	2.678(+8)	1.000	1.000	1.993	.3344
+3	5.930(+3)	1.599(35)	2.654(+11)	1.000	1.000	1.999	.3334
+4	5.930(+4)	1.598(38)	2.652(+14)	1.000	1.000	2.000	0.3333

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = -5$ )

$\log_{10}\beta$	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	1.482(19)	2.461(-5)	1.001	1.001	0.6667
-5	5.930(-5)	4.688(20)	7.781(-4)	1.001	1.001	.6667
-4	5.930(-4)	1.483(22)	2.461(-2)	1.001	1.001	.6666
-3	5.930(-3)	4.697(23)	7.796(-1)	1.001	1.002	.6658
-2	5.930(-2)	1.510(25)	2.507(+1)	1.001	1.014	.6585
-1.5	1.875(-1)	8.838(25)	1.467(+2)	1.001	1.040	.6421
-1	5.930(-1)	5.605(26)	9.304(+2)	1.001	1.114	.5988
-0.5	1.875(0)	4.398(27)	7.299(+3)	1.001	1.296	.5151
0	5.930(0)	5.229(28)	8.680(+4)	1.001	1.582	.4218
+0.5	1.875(+1)	1.003(30)	1.665(+6)	1.000	1.821	.3662
+1	5.930(+1)	2.612(31)	4.335(+7)	1.000	1.938	.3442
+1.5	1.875(+2)	7.731(32)	1.283(+9)	1.000	1.980	.3368
+2	5.930(+2)	2.393(34)	3.972(+10)	1.000	1.994	.3344
+3	5.930(+3)	2.372(37)	3.936(+13)	1.000	2.000	.3334
+4	5.930(+4)	2.370(40)	3.933(+16)	1.000	2.000	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 0$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	1.687(21)	2.801(-3)	1.133	1.133	0.6667
-5	5.930(-5)	5.336(22)	8.857(-2)	1.133	1.133	.6667
-4	5.930(-4)	1.688(24)	2.801(0)	1.133	1.134	.6666
-3	5.930(-3)	5.348(25)	8.876(+1)	1.133	1.135	.6658
-2	5.930(-2)	1.724(27)	2.861(+3)	1.132	1.147	.6580
-1.5	1.875(-1)	1.014(28)	1.682(+4)	1.129	1.175	.6405
-1	5.930(-1)	6.521(28)	1.082(+5)	1.122	1.256	.5952
-0.5	1.875(0)	5.287(29)	8.776(+5)	1.104	1.444	.5098
0	5.930(0)	6.592(30)	1.094(+7)	1.080	1.722	.4180
+0.5	1.875(+1)	1.311(32)	2.176(+8)	1.062	1.942	.3647
+1	5.930(+1)	3.468(33)	5.756(+9)	1.054	2.045	.3437
+1.5	1.875(+2)	1.032(35)	1.714(+11)	1.052	2.083	.3367
+2	5.930(+2)	3.202(36)	5.314(+12)	1.051	2.095	.3344
+3	5.930(+3)	3.176(39)	5.271(+15)	1.050	2.100	.3334
+4	5.930(+4)	3.173(42)	5.267(+18)	1.050	2.101	0.3333

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 5$ )

$\log_{10}\beta$	$(\beta = kT/m_e c^2)$	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	1.950(22)	3.237(-2)	2.365	2.365	0.6667	
-5	5.930(-5)	6.168(23)	1.024(0)	2.365	2.365	.6666	
-4	5.930(-4)	1.951(25)	3.239(+1)	2.365	2.365	.6665	
-3	5.930(-3)	6.195(26)	1.028(+3)	2.362	2.368	.6651	
-2	5.930(-2)	2.038(28)	3.382(+4)	2.342	2.394	.6520	
-1.5	1.875(-1)	1.254(29)	2.082(+5)	2.297	2.453	.6242	
-1	5.930(-1)	9.111(29)	1.512(+6)	2.187	2.600	.5607	
-0.5	1.875(0)	9.404(30)	1.561(+7)	1.999	2.857	.4665	
0	5.930(0)	1.562(32)	2.593(+8)	1.820	3.110	.3901	
+0.5	1.875(+1)	3.746(33)	6.217(+9)	1.724	3.252	.3534	
+1	5.930(+1)	1.073(35)	1.781(+11)	1.687	3.309	.3399	
+1.5	1.875(+2)	3.284(36)	5.452(+12)	1.674	3.328	.3354	
+2	5.930(+2)	1.028(38)	1.706(+14)	1.670	3.334	.3340	
+3	5.930(+3)	1.023(41)	1.699(+17)	1.669	3.336	.3334	
+4	5.930(+4)	1.023(44)	1.698(+20)	1.668	3.337	0.3333	

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 10$ )

$\log_{10}\beta$	$(\beta = kT/m_e c^2)$	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/\mu_e$
-6	5.930(-6)	5.312(22)	8.816(-2)	4.194	4.194	4.194	0.6667
-5	5.930(-5)	1.680(24)	2.788(0)	4.194	4.194	4.194	.6666
-4	5.930(-4)	5.316(25)	8.823(+1)	4.193	4.193	4.195	.6664
-3	5.930(-3)	1.693(27)	2.810(+3)	4.185	4.185	4.201	.6641
-2	5.930(-2)	5.735(28)	9.519(+4)	4.111	4.111	4.264	.6428
-1.5	1.875(-1)	3.761(29)	6.242(+5)	3.960	3.960	4.393	.6010
-1	5.930(-1)	3.165(30)	5.253(+6)	3.642	3.642	4.667	.5202
-0.5	1.875(0)	4.110(31)	6.821(+7)	3.228	3.228	5.028	.4281
0	5.930(0)	8.347(32)	1.385(+9)	2.935	2.935	5.288	.3700
+0.5	1.875(+1)	2.222(34)	3.689(+10)	2.804	2.804	5.407	.3458
+1	5.930(+1)	6.627(35)	1.100(+12)	2.757	2.757	5.449	.3374
+1.5	1.875(+2)	2.056(37)	3.413(+13)	2.742	2.742	5.463	.3346
+2	5.930(+2)	6.463(38)	1.073(+15)	2.737	2.737	5.468	.3337
+3	5.930(+3)	6.446(41)	1.070(+18)	2.735	2.735	5.470	.3334
+4	5.930(+4)	6.445(44)	1.070(+21)	2.735	2.735	5.470	0.3333

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 15$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/\mu_e$
-6	5.930(-6)	9.691(22)	1.608(-1)	6.130	6.130	0.6667
-5	5.930(-5)	3.065(24)	5.087(0)	6.130	6.131	.6666
-4	5.930(-4)	9.702(25)	1.610(+2)	6.129	6.132	.6663
-3	5.930(-3)	3.100(27)	5.145(+3)	6.111	6.145	.6630
-2	5.930(-2)	1.083(29)	1.797(+5)	5.951	6.265	.6333
-1.5	1.875(-1)	7.548(29)	1.253(+6)	5.646	6.495	.5796
-1	5.930(-1)	7.201(30)	1.195(+7)	5.084	6.920	.4898
-0.5	1.875(0)	1.094(32)	1.816(+8)	4.485	7.377	.4053
0	5.930(0)	2.481(33)	4.118(+9)	4.129	7.652	.3597
+0.5	1.875(+1)	6.941(34)	1.152(+11)	3.984	7.764	.3421
+1	5.930(+1)	2.107(36)	3.497(+12)	3.935	7.803	.3362
+1.5	1.875(+2)	6.575(37)	1.091(+14)	3.918	7.816	.3342
+2	5.930(+2)	2.070(39)	3.437(+15)	3.913	7.820	.3336
+3	5.930(+3)	2.067(42)	3.431(+18)	3.911	7.821	.3334
+4	5.930(+4)	2.066(45)	3.430(+21)	3.911	7.822	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 20$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	1.488(23)	2.471(-1)	8.098	8.098	0.6667
-5	5.930(-5)	4.708(24)	7.814(0)	8.098	8.098	.6666
-4	5.930(-4)	1.491(26)	2.474(+2)	8.095	8.101	.6662
-3	5.930(-3)	4.779(27)	7.931(+3)	8.064	8.123	.6619
-2	5.930(-2)	1.720(29)	2.855(+5)	7.789	8.320	.6241
-1.5	1.875(-1)	1.270(30)	2.108(+6)	7.296	8.672	.5608
-1	5.930(-1)	1.345(31)	2.232(+7)	6.486	9.254	.4673
-0.5	1.875(0)	2.283(32)	3.790(+8)	5.743	9.791	.3910
0	5.930(0)	5.535(33)	9.187(+9)	5.349	10.08	.3538
+0.5	1.875(+1)	1.592(35)	2.642(+11)	5.197	10.19	.3401
+1	5.930(+1)	4.879(36)	8.099(+12)	5.146	10.23	.3355
+1.5	1.875(+2)	1.528(38)	2.536(+14)	5.129	10.24	.3340
+2	5.930(+2)	4.815(39)	7.993(+15)	5.124	10.24	.3335
+3	5.930(+3)	4.809(42)	7.982(+18)	5.122	10.24	.3334
+4	5.930(+4)	4.808(45)	7.981(+21)	5.122	10.24	0.3333

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 25$ )

$\log_{10}\beta$	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	2.078(23)	3.449(-1)	10.08	10.08	0.6667
-5	5.930(-5)	6.572(24)	1.091(+1)	10.08	10.08	.6666
-4	5.930(-4)	2.082(26)	3.455(+2)	10.07	10.08	.6661
-3	5.930(-3)	6.695(27)	1.111(+4)	10.03	10.12	.6607
-2	5.930(-2)	2.483(29)	4.121(+5)	9.608	10.41	.6154
-1.5	1.875(-1)	1.933(30)	3.208(+6)	8.903	10.90	.5446
-1	5.930(-1)	2.234(31)	3.707(+7)	7.857	11.63	.4502
-0.5	1.875(0)	4.116(32)	6.832(+8)	7.000	12.24	.3814
0	5.930(0)	1.044(34)	1.732(+10)	6.580	12.53	.3501
+0.5	1.875(+1)	3.055(35)	5.071(+11)	6.424	12.64	.3388
+1	5.930(+1)	9.420(36)	1.564(+13)	6.372	12.68	.3351
+1.5	1.875(+2)	2.955(38)	4.905(+14)	6.356	12.69	.3339
+2	5.930(+2)	9.321(39)	1.547(+16)	6.350	12.69	.3335
+3	5.930(+3)	9.311(42)	1.545(+19)	6.348	12.70	.3334
+4	5.930(+4)	9.310(45)	1.545(+22)	6.348	12.70	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 30$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm/cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	2.730(23)	4.531(-1)	12.06	12.06	0.6667
-5	5.930(-5)	8.634(24)	1.433(+1)	12.06	12.07	.6666
-4	5.930(-4)	2.736(26)	4.541(+2)	12.06	12.07	.6660
-3	5.930(-3)	8.828(27)	1.465(+4)	11.99	12.12	.6596
-2	5.930(-2)	3.370(29)	5.594(+5)	11.40	12.52	.6072
-1.5	1.875(-1)	2.756(30)	4.574(+6)	10.47	13.16	.5303
-1	5.930(-1)	3.431(31)	5.694(+7)	9.202	14.04	.4370
-0.5	1.875(0)	6.733(32)	1.118(+9)	8.255	14.70	.3745
0	5.930(0)	1.763(34)	2.926(+10)	7.817	15.00	.3474
+0.5	1.875(+1)	5.223(35)	8.669(+11)	7.659	15.11	.3379
+1	5.930(+1)	1.617(37)	2.684(+13)	7.606	15.15	.3348
+1.5	1.875(+2)	5.079(38)	8.430(+14)	7.590	15.16	.3338
+2	5.930(+2)	1.603(40)	2.660(+16)	7.584	15.16	.3335
+3	5.930(+3)	1.601(43)	2.658(+19)	7.582	15.16	.3333
+4	5.930(+4)	1.601(46)	2.658(+22)	7.582	15.16	0.3333

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 35$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_g = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm/cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	3.439(23)	5.708(-1)	14.06	14.06	0.6667
-5	5.930(-5)	1.088(25)	1.805(+1)	14.05	14.06	.6666
-4	5.930(-4)	3.448(26)	5.722(+2)	14.05	14.06	.6658
-3	5.930(-3)	1.116(28)	1.853(+4)	13.95	14.13	.6585
-2	5.930(-2)	4.384(29)	7.276(+5)	13.18	14.66	.5994
-1.5	1.875(-1)	3.752(30)	6.228(+6)	12.01	15.46	.5179
-1	5.930(-1)	4.980(31)	8.266(+7)	10.53	16.47	.4263
-0.5	1.875(0)	1.027(33)	1.705(+9)	9.509	17.17	.3693
0	5.930(0)	2.754(34)	4.571(+10)	9.058	17.48	.3455
+0.5	1.875(+1)	8.234(35)	1.367(+12)	8.897	17.59	.3373
+1	5.930(+1)	2.557(37)	4.244(+13)	8.845	17.62	.3346
+1.5	1.875(+2)	8.038(38)	1.334(+15)	8.828	17.63	.3337
+2	5.930(+2)	2.537(40)	4.211(+16)	8.823	17.64	.3335
+3	5.930(+3)	2.535(43)	4.208(+19)	8.820	17.64	.3333
+4	5.930(+3)	2.535(46)	4.208(+22)	8.820	17.64	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 40$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	4.200(23)	6.972(-1)	16.05	16.05	0.6667
-5	5.930(-5)	1.329(25)	2.205(+1)	16.05	16.05	.6666
-4	5.930(-4)	4.213(26)	6.993(+2)	16.04	16.06	.6657
-3	5.930(-3)	1.368(28)	2.271(+4)	15.91	16.14	.6574
-2	5.930(-2)	5.526(29)	9.171(+5)	14.93	16.81	.5920
-1.5	1.875(-1)	4.936(30)	8.193(+6)	13.51	17.77	.5068
-1	5.930(-1)	6.925(31)	1.149(+8)	11.84	18.91	.4177
-0.5	1.875(0)	1.487(33)	2.469(+9)	10.76	19.64	.3652
0	5.930(0)	4.063(34)	6.743(+10)	10.30	19.96	.3441
+0.5	1.875(+1)	1.223(36)	2.030(+12)	10.14	20.07	.3368
+1	5.930(+1)	3.805(37)	6.316(+13)	10.09	20.11	.3344
+1.5	1.875(+2)	1.197(39)	1.987(+15)	10.07	20.12	.3337
+2	5.930(+2)	3.780(40)	6.274(+16)	10.06	20.12	.3334
+3	5.930(+3)	3.777(43)	6.270(+19)	10.06	20.12	.3333
+4	5.930(+4)	3.777(46)	6.269(+22)	10.06	20.12	0.3333

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 45$ )

$\log_{10}\beta$	$(\beta = kT/m_e c^2)$	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)		5.011(23)	8.318(-1)	18.04	18.04	0.6667
-5	5.930(-5)		1.585(25)	2.631(+1)	18.04	18.04	.6666
-4	5.930(-4)		5.028(26)	8.346(+2)	18.03	18.06	.6656
-3	5.930(-3)		1.639(28)	2.720(+4)	17.87	18.16	.6562
-2	5.930(-2)		6.799(29)	1.128(+6)	16.66	18.98	.5849
-1.5	1.875(-1)		6.320(30)	1.049(+7)	14.99	20.11	.4970
-1	5.930(-1)		9.311(31)	1.545(+8)	13.15	21.36	.4104
-0.5	1.875(0)		2.068(33)	3.432(+9)	12.02	22.13	.3620
0	5.930(0)		5.732(34)	9.514(+10)	11.54	22.44	.3429
+0.5	1.875(+1)		1.734(36)	2.878(+12)	11.38	22.56	.3364
+1	5.930(+1)		5.407(37)	8.974(+13)	11.33	22.59	.3343
+1.5	1.875(+2)		1.702(39)	2.825(+15)	11.31	22.60	.3336
+2	5.930(+2)		5.375(40)	8.921(+16)	11.31	22.61	.3334
+3	5.930(+3)		5.371(43)	8.915(+19)	11.30	22.61	.3333
+4	5.930(+4)		5.371(46)	8.915(+22)	11.30	22.61	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 50$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	5.869(23)	9.741(-1)	20.04	20.04	0.6666
-5	5.930(-5)	1.856(25)	3.081(+1)	20.04	20.04	.6665
-4	5.930(-4)	5.891(26)	9.777(+2)	20.02	20.05	.6655
-3	5.930(-3)	1.926(28)	3.197(+4)	19.83	20.18	.6551
-2	5.930(-2)	8.207(29)	1.362(+6)	18.36	21.17	.5783
-1.5	1.875(-1)	7.918(30)	1.314(+7)	16.45	22.46	.4882
-1	5.930(-1)	1.218(32)	2.022(+8)	14.45	23.82	.4044
-0.5	1.875(0)	2.782(33)	4.617(+9)	13.27	24.61	.3594
0	5.930(0)	7.806(34)	1.296(+11)	12.79	24.93	.3420
+0.5	1.875(+1)	2.372(36)	3.937(+12)	12.63	25.04	.3361
+1	5.930(+1)	7.405(37)	1.229(+14)	12.57	25.08	.3342
+1.5	1.875(+2)	2.332(39)	3.871(+15)	12.56	25.09	.3336
+2	5.930(+2)	7.365(40)	1.222(+17)	12.55	25.10	.3334
+3	5.930(+3)	7.361(43)	1.222(+20)	12.55	25.10	.3333
+4	5.930(+4)	7.361(46)	1.222(+23)	12.55	25.10	0.3333

Table A.3.1 (Continued)

IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*

 $(\eta = 55)$ 

$\log_{10}\beta$	$(\beta = kT/m_e c^2)$	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/\mu_e$
-6	5.930(-6)		6.770(23)	1.124(0)	22.04	22.04	0.6666
-5	5.930(-5)		2.142(25)	3.555(1)	22.03	22.04	.6665
-4	5.930(-4)		6.798(26)	1.128(3)	22.01	22.05	.6654
-3	5.930(-3)		2.230(28)	3.701(4)	21.78	22.20	.6540
-2	5.930(-2)		9.752(29)	1.619(6)	20.05	23.37	.5720
-1.5	1.875(-1)		9.744(30)	1.617(7)	17.89	24.83	.4803
-1	5.930(-1)		1.558(32)	2.586(8)	15.73	26.28	.3992
-0.5	1.875(0)		3.644(33)	6.048(9)	14.52	27.10	.3572
0	5.930(0)		1.033(35)	1.714(11)	14.04	27.42	.3412
+0.5	1.875(+1)		3.150(36)	5.228(12)	13.87	27.54	.3359
+1	5.930(+1)		9.844(37)	1.634(14)	13.82	27.57	.3341
+1.5	1.875(+2)		3.101(39)	5.148(15)	13.80	27.58	.3336
+2	5.930(+2)		9.796(40)	1.626(17)	13.80	27.59	.3334
+3	5.930(+3)		9.792(43)	1.625(20)	13.79	27.59	.3333
+4	5.930(+4)		9.791(46)	1.625(23)	13.79	27.59	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 60$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/n_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	7.714(23)	1.280(0)	24.03	24.03	0.6666
-5	5.930(-5)	2.440(25)	4.050(1)	24.03	24.03	.6665
-4	5.930(-4)	7.748(26)	1.286(3)	24.00	24.05	.6652
-3	5.930(-3)	2.550(28)	4.232(4)	23.74	24.23	.6529
-2	5.930(-2)	1.144(30)	1.898(6)	21.72	25.59	.5659
-1.5	1.875(-1)	1.181(31)	1.960(7)	19.31	27.21	.4732
-1	5.930(-1)	1.955(32)	3.244(8)	17.02	28.75	.3947
-0.5	1.875(0)	4.668(33)	7.748(9)	15.77	29.59	.3553
0	5.930(0)	1.334(35)	2.215(11)	15.28	29.92	.3406
+0.5	1.875(+1)	4.081(36)	6.774(12)	15.12	30.03	.3356
+1	5.930(+1)	1.277(38)	2.119(14)	15.07	30.06	.3341
+1.5	1.875(+2)	4.024(39)	6.679(15)	15.05	30.08	.3336
+2	5.930(+2)	1.271(41)	2.110(17)	15.04	30.08	.3334
+3	5.930(+3)	1.270(44)	2.109(20)	15.04	30.08	.3333
+4	5.930(+4)	1.270(47)	2.109(23)	15.04	30.08	0.3333

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 65$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho \mu_e(\text{gm cm}^{-3})$	$P_e n_e A T$	$u_e(3n_e A T^2)$	$P_e u_e$
-6	5.930(-6)	8.697(23)	1.444(0)	26.03	26.03	0.6666
-5	5.930(-5)	2.751(25)	4.567(1)	26.03	26.03	.6665
-4	5.930(-4)	8.739(26)	1.450(3)	25.99	26.05	.6651
-3	5.930(-3)	2.885(28)	4.789(4)	25.68	26.26	.6518
-2	5.930(-2)	1.327(30)	2.202(6)	23.37	27.81	.5602
-1.5	1.875(-1)	1.413(31)	2.346(7)	20.72	29.60	.4667
-1	5.930(-1)	2.413(32)	4.005(8)	18.30	31.22	.3907
-0.5	1.875(0)	5.868(33)	9.739(9)	17.02	32.08	.3537
0	5.930(0)	1.690(35)	2.804(11)	16.53	32.41	.3400
+0.5	1.875(+1)	5.180(36)	8.598(12)	16.37	32.52	.3355
+1	5.930(+1)	1.622(38)	2.692(14)	16.31	32.56	.3340
+1.5	1.875(+2)	5.113(39)	8.487(15)	16.30	32.57	.3335
+2	5.930(+2)	1.615(41)	2.681(17)	16.29	32.57	.3334
+3	5.930(+3)	1.615(44)	2.680(20)	16.29	32.58	.3333
+4	5.930(+4)	1.615(47)	2.680(23)	16.29	32.58	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.3.1 (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS NEGLECTED\*  
 ( $\eta = 70$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$T_9 = T(^{\circ}\text{K})/10^9$	$n_e(\text{cm}^{-3})$	$\rho/\mu_e(\text{gm}/\text{cm}^3)$	$P_e/h_e kT$	$u_e/(3n_e kT/2)$	$P_e/u_e$
-6	5.930(-6)	9.719(23)	1.613(0)	28.03	28.03	0.6666
-5	5.930(-5)	3.075(25)	5.104(1)	28.02	28.03	.6665
-4	5.930(-4)	9.770(26)	1.622(3)	27.99	28.06	.6650
-3	5.930(-3)	3.236(28)	5.372(4)	27.62	28.30	.6508
-2	5.930(-2)	1.525(30)	2.531(6)	25.01	30.05	.5548
-1.5	1.875(-1)	1.673(31)	2.776(7)	22.11	32.00	.4607
-1	5.930(-1)	2.938(32)	4.876(8)	19.58	33.70	.3873
-0.5	1.875(0)	7.257(33)	1.204(10)	18.27	34.57	.3523
0	5.930(0)	2.103(35)	3.490(11)	17.78	34.91	.3396
+0.5	1.875(+1)	6.462(36)	1.072(13)	17.61	35.02	.3353
+1	5.930(+1)	2.025(38)	3.360(14)	17.56	35.05	.3340
+1.5	1.875(+2)	6.384(39)	1.060(16)	17.54	35.07	.3335
+2	5.930(+2)	2.017(41)	3.347(17)	17.54	35.07	.3334
+3	5.930(+3)	2.016(44)	3.346(20)	17.54	35.07	.3333
+4	5.930(+4)	2.016(47)	3.346(23)	17.54	35.07	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

## *Ideal Fermi-Dirac Equation of State,*

*ELECTRON-POSITRON PAIRS INCLUDED*

Table A.4.1 gives values of certain quantities for an electron-positron gas in which the electrons and positrons are in chemical equilibrium with each other and obey the ideal Fermi-Dirac equation of state, for  $-30 \leq \eta \leq +5$  and  $10^{-6} \leq \beta \leq A$ , where  $A = -1/\eta$  for  $\eta < 0$  and  $A = 10^4$  for  $\eta \geq 0$ ;  $\eta$  is the degeneracy parameter and  $\beta = kT/mc^2$  ( $k =$  Boltzmann's constant,  $T =$  temperature,  $m =$  electron rest mass,  $c =$  velocity of light in vacuo). These quantities are  $n_e^{(m)}$ , the number density of ionization electrons (see Sect. 15.1);  $\rho_m/\mu_e$ , where  $\rho_m$  is the total (rest) mass density of atoms, ions, and ionization electrons and  $\mu_e$  is the mean molecular weight per free (ionization) electron (see Sect. 24.3);  $n_+/n_e^{(m)}$ , where  $n_+$  is the number density of positrons;  $P_{e\pm}/(aT^4/3)$ , where  $P_{e\pm}$  is the sum of the electron and positron pressures and  $a$  is the radiation pressure constant;  $P_{e\pm}/n_e^{(m)}kT$ ;  $u_{e\pm}/aT^4$ , where  $u_{e\pm}$  is the sum of the electron kinetic energy, the positron kinetic energy, the positron rest energy, and the rest energy of all electrons present *except* ionization electrons, all per unit volume;  $u_{e\pm}/(3n_e^{(m)}kT/2)$ ; and  $P_{e\pm}/u_{e\pm}$ . These quantities were computed from the formulae given in Sect. 24.9.

Table A.4.2 gives values of the quantity  $n_+/n_e^{(m)}$  for  $10^{-6} \leq \beta \leq 10^{+4}$  and for  $+10 \leq \eta \leq +70$ ; the other quantities referred to in the foregoing paragraph have the same values, to four significant figures or better, as the corresponding quantities in Table A.3.1 for this range of  $(\eta, \beta)$  values.

Some of the entries were evaluated with the help of a computer program kindly made available to us by Terry W. Edwards.

Table A.4.1\*  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED †  
 ( $\eta = -30$ ) ‡

$\log_{10} \beta$ ( $\beta = kT/m_e c^2$ )	$n_e^{(m)}$ ( $\text{cm}^{-3}$ ) $= n_e - n_+$	$\rho_m/\mu_e$ ( $\text{gm}/\text{cm}^3$ )	$n_+/n_e^{(m)}$	$P_{e\pm}/(aT^4/3)$	$P_{e\pm}/n_e^{(m)}kT$	$u_{e\pm}/aT^4$	$u_{e\pm}/(3n_e^{(m)}kT/2)$	$P_{e\pm}/u_{e\pm}$
-6	2.064(8)	3.425(-16)	1.241(-868563)	5.418(-5)	1.000(0)	2.709(-5)	1.000(0)	0.6667
-5	6.526(9)	1.083(-14)	1.450(-86833)	1.713(-6)	1.000(0)	8.567(-7)	1.000(0)	.6667
-4	2.064(11)	3.426(-13)	1.472(-8660)	5.419(-8)	1.000(0)	2.710(-8)	1.000(0)	.6666
-3	6.538(12)	1.085(-11)	2.942(-843)	1.716(-9)	1.000(0)	8.593(-10)	1.001(0)	.6658
-2	2.103(14)	3.490(-10)	1.580(-61)	5.520(-11)	1.000(0)	2.794(-11)	1.012(0)	.6585
-1.5	1.182(15)	1.962(-9)	4.052(-2)	1.061(-11)	1.081(0)	1.390(-11)	1.122(0)	.2546
$\log(1/30)$	0	0	$\infty$	1.893(-11)	$\infty$	1.992(-10)	$\infty$	0.03168

† For  $\beta = (1/30)$ ,  $T_3 = 1.977(-1)$  and  $n_e = n_+ = 1.336(15)$ .

Table A.4.1\* (Continued)

IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED †  
( $\eta = -25$ ) ‡

$\log_{10} \beta$ ( $\beta = kT/m_e c^2$ )	$n_e^{(m)} (\text{cm}^{-3})$ $= n_e - n_+$	$\rho_m / \mu_e (\text{gm/cm}^3)$	$n_+ / n_e^{(m)}$	$P_{e\pm} / (aT^4/3)$	$P_{e\pm} / n_e^{(m)} kT$	$u_{e\pm} / aT^4$	$u_{e\pm} / (3n_e^{(m)} kT/2)$	$P_{e\pm} / u_{e\pm}$
-6	3.063(10)	5.084(-14)	5.635(-868568)	8.041(-3)	1.000(0)	4.021(-3)	1.000(0)	0.6667
-5	9.686(11)	1.608(-12)	6.582(-86838)	2.543(-4)	1.000(0)	1.271(-4)	1.000(0)	.6667
-4	3.063(13)	5.084(-11)	6.685(-8665)	8.042(-6)	1.000(0)	4.022(-6)	1.000(0)	.6666
-3	9.703(14)	1.611(-9)	1.336(-847)	2.458(-7)	1.000(0)	1.275(-7)	1.001(0)	.6658
-2	3.121(16)	5.180(-8)	7.175(-66)	8.193(-9)	1.000(0)	4.147(-9)	1.012(0)	.6585
-1.5	1.826(17)	3.030(-7)	1.768(-6)	1.516(-9)	1.000(0)	7.870(-10)	1.038(0)	.6420
$\log(1/25)$	0	0	$\infty$	2.164(-9)	$\infty$	1.916(-8)	$\infty$	0.03763

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

† Values of  $n_e$  are the same as in Table A.3.1.

‡ For  $\beta = (1/25)$ ,  $T_e = 2.372(-1)$  and  $n_e = n_+ = 2.637(17)$ .

Table A.4.1\* (Continued)  
 IDEAL FERMION-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED †  
 ( $\eta = -20$ ) ‡

$\log_{10} \beta$ ( $\beta = kT/m_e c^2$ )	$n_e^{(m)} (\text{cm}^{-3})$ $= n_e - n_+$	$\rho_m / \mu_e (\text{gm/cm}^3)$	$n_+ / n_e^{(m)}$	$P_{e\pm} / (aT^4/3)$	$P_{e\pm} / n_e^{(m)} kT$	$u_{e\pm} / aT^4$	$u_{e\pm} / (3n_e^{(m)} kT/2)$	$P_{e\pm} / u_{e\pm}$
-6	4.546(12)	7.545(-12)	2.558(-868572)	1.193(0)	1.000(0)	5.967(-1)	1.000(0)	0.6667
-5	1.438(14)	2.386(-10)	2.988(-86842)	3.774(-2)	1.000(0)	1.887(-2)	1.000(0)	.6667
-4	4.546(15)	7.546(-9)	3.035(-8669)	1.194(-3)	1.000(0)	5.969(-4)	1.000(0)	.6666
-3	1.440(17)	2.390(-7)	6.065(-852)	3.781(-5)	1.000(0)	1.893(-5)	1.001(0)	.6658
-2	4.631(18)	7.687(-6)	3.257(-70)	1.216(-6)	1.000(0)	6.154(-7)	1.012(0)	.6585
-1.5	2.710(19)	4.498(-5)	8.028(-11)	2.250(-7)	1.000(0)	1.168(-7)	1.038(0)	.6421
$\log(1/20)$	0	0	$\infty$	2.339(-7)	$\infty$	1.683(-6)	$\infty$	0.04632

† For  $\beta = (1/20)$ ,  $T_s = 2.965(-1)$  and  $n_e = n_+ = 5.569(19)$ .

Table A.4.1\* (Continued)

IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED †  
( $\eta = -15$ ) ‡

$\log_{10} \beta$ ( $\beta = kT/m_e c^2$ )	$n_e^{(m)}$ (cm <sup>-3</sup> ) $= n_e - n_+$	$\rho_m/\mu_e$ (gm/cm <sup>3</sup> )	$n_+/n_e^{(m)}$	$P_{e\pm}/(aT^4/3)$	$P_{e\pm}/n_e^{(m)}kT$	$u_{e\pm}/aT^4$	$u_{e\pm}/(3n_e^{(m)}kT/2)$	$P_{e\pm}/u_{e\pm}$
-6	6.746(14)	1.120(-9)	1.162(-868576)	1.771(2)	1.000(0)	8.856(+1)	1.000(0)	0.6667
-5	2.133(16)	3.541(-8)	1.357(-86846)	5.601(0)	1.000(0)	2.800(0)	1.000(0)	.6667
-4	6.748(17)	1.120(-6)	1.378(-8673)	1.771(-1)	1.000(0)	8.858(-2)	1.000(0)	.6666
-3	2.137(19)	3.548(-5)	2.753(-856)	5.611(-3)	1.000(0)	2.809(-3)	1.001(0)	.6658
-2	6.873(20)	1.141(-3)	1.479(-74)	1.804(-4)	1.000(0)	9.134(-5)	1.012(0)	.6585
-1.5	4.022(21)	6.675(-3)	3.645(-15)	3.339(-5)	1.000(0)	1.733(-5)	1.038(0)	.6421
$\log(1/15)$	0	0	$\infty$	2.322(-5)	$\infty$	1.286(-4)	$\infty$	0.06018

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

† Values of  $n_e$  are the same as in Table A.3.1.

‡ For  $\beta = (1/15)$ ,  $T_e = 3.953(-1)$  and  $n_e = n_+ = 1.311(22)$ .

Table A.4.1\* (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED †  
 ( $\eta = -10$ ) ‡

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$n_e^{(m)}(\text{cm}^{-3})$ $= n_e - n_+$	$\rho_m/\mu_e(\text{gm/cm}^3)$	$n_+/n_e^{(m)}$	$P_{e\pm}/(aT^4/3)$	$P_{e\pm}/n_e^{(m)}kT$	$u_{e\pm}/aT^4$	$u_{e\pm}/(3n_e^{(m)}kT/2)$	$P_{e\pm}/u_{e\pm}$
-6	1.001(17)	1.662(-7)	5.273(-868581)	2.629(+4)	1.000(0)	1.314(+4)	1.000(0)	0.6667
-5	3.166(18)	5.255(-6)	6.159(-86851)	8.312(+2)	1.000(0)	4.156(+2)	1.000(0)	.6667
-4	1.001(20)	1.662(-4)	6.255(-8678)	2.629(+1)	1.000(0)	1.315(+1)	1.000(0)	.6666
-3	3.172(21)	5.265(-3)	1.250(-860)	8.328(-1)	1.000(0)	4.169(-1)	1.001(0)	.6658
-2	1.020(23)	1.693(-1)	6.714(-79)	2.678(-2)	1.000(0)	1.356(-2)	1.012(0)	.6585
-1.5	5.969(23)	9.907(-1)	1.655(-19)	4.955(-3)	1.000(0)	2.572(-3)	1.038(0)	.6421
-1	0	0	$\infty$	1.987(-3)	$\infty$	7.731(-3)	$\infty$	0.08569

† For  $\beta = (1/10)$ ,  $T_0 = 5.930(-1)$  and  $n_0 = n_+ = 3.785(24)$ .

Table A.4.1\* (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED †  
 ( $\eta = -5$ ) ‡

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$n_e^{(m)}(\text{cm}^{-3})$ $= n_e - n_+$	$\rho_m/\mu_e(\text{gm/cm}^3)$	$n_+/n_e^{(m)}$	$P_{e\pm}/(aT^4/3)$	$P_{e\pm}/n_e^{(m)}kT$	$u_{e\pm}/aT^4$	$u_{e\pm}/(3n_e^{(m)}kT/2)$	$P_{e\pm}/u_{e\pm}$
-6	1.482(19)	2.461(-5)	2.400(-868585)	3.897(+6)	1.001(0)	1.948(+6)	1.001(0)	0.6667
-5	4.688(20)	7.781(-4)	2.803(-86855)	1.232(+5)	1.001(0)	6.161(+4)	1.001(0)	.6667
-4	1.483(22)	2.461(-2)	2.847(-8682)	3.897(+3)	1.001(0)	1.949(+3)	1.001(0)	.6666
-3	4.697(23)	7.796(-1)	5.698(-865)	1.234(+2)	1.001(0)	6.180(+1)	1.002(0)	.6658
-2	1.510(25)	2.507(+1)	3.055(-83)	3.970(0)	1.001(0)	2.010(0)	1.014(0)	.6585
-1.5	8.838(25)	1.467(+2)	7.529(-24)	7.346(-1)	1.001(0)	3.814(-1)	1.040(0)	.6421
-1	5.605(26)	9.303(+2)	4.550(-5)	1.473(-1)	1.001(0)	8.205(-2)	1.115(0)	.5985
$\log(1/5)$	0	0	$\infty$	1.225(-1)	$\infty$	2.778(-1)	$\infty$	0.1470

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.  
 † Values of  $n_e$  are the same as in Table A.3.1.  
 ‡ For  $\beta = (1/5)$ ,  $T_e = 1.186(0)$  and  $n_e = n_+ = 1.865(27)$ .

Table A.4.1\* (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED  
 ( $\eta = -3$ )†

$\log_{10} \beta$ ( $\beta = kT/m_e c^2$ )	$n_e^{(m)} (\text{cm}^{-3})$ $= n_e - n_+$	$\rho_m/\mu_e (\text{gm/cm}^3)$	$n_+/n_e^{(m)}$	$P_{e\pm}/(aT^4/3)$	$P_{e\pm}/n_e^{(m)}kT$	$u_{e\pm}/aT^4$	$u_{e\pm}/(3n_e^{(m)}kT/2)$	$P_{e\pm}/u_{e\pm}$
-6	1.079(20)	1.791(-4)	4.461(-868587)	2.858(+7)	1.009(0)	1.429(+7)	1.009(0)	0.6667
-5	3.413(21)	5.664(-3)	5.211(-86857)	9.037(+5)	1.009(0)	4.519(+5)	1.009(0)	.6667
-4	1.079(23)	1.792(-1)	5.292(-8684)	2.858(+4)	1.009(0)	1.429(+4)	1.009(0)	.6666
-3	3.419(24)	5.675(0)	1.058(-866)	9.054(+2)	1.009(0)	4.533(+3)	1.010(0)	.6658
-2	1.100(26)	1.825(+2)	5.679(-85)	2.912(+1)	1.009(0)	1.474(+1)	1.021(0)	.6585
-1.5	6.437(26)	1.068(+3)	1.399(-25)	5.388(0)	1.008(0)	2.798(0)	1.047(0)	.6420
-1	4.086(27)	6.781(+3)	8.448(-7)	1.081(0)	1.008(0)	6.020(-1)	1.122(0)	.5986
-0.5	8.814(27)	1.463(+4)	2.644(0)	4.628(-1)	6.325(0)	7.075(-1)	1.934(+1)	.2181
$\log(1/3)$	0	0	$\infty$	5.080(-1)	$\infty$	8.365(-1)	$\infty$	.2024

† For  $\beta = (1/3)$ ,  $T_9 = 1.977(0)$  and  $n_e = n_+ = 3.560(28)$ .

Table A.4.1\* (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED  
 ( $\eta = -1$ )<sup>†</sup>

$\log_{10} \beta$ ( $\beta = kT/m_e c^2$ )	$n_e^{(m)}$ (cm <sup>-3</sup> ) = $n_e - n_+$	$\rho_m/\mu_e$ (gm/cm <sup>3</sup> )	$n_+/n_e^{(m)}$	$P_{e\pm}/(aT^4/3)$	$P_{e\pm}/n_e^{(m)}kT$	$u_{e\pm}/aT^4$	$u_{e\pm}/(3n_e^{(m)}kT/2)$	$P_{e\pm}/u_{e\pm}$
-6	7.229(20)	1.200(-3)	9.013(-868589)	2.007(8)	1.058(0)	1.004(8)	1.058(0)	0.6667
-5	2.286(22)	3.794(-2)	1.053(-86858)	6.347(6)	1.058(0)	3.174(6)	1.058(0)	.6667
-4	7.231(23)	1.200(0)	1.069(-8685)	2.008(5)	1.058(0)	1.004(5)	1.058(0)	.6666
-3	2.291(25)	3.802(+1)	2.136(-868)	6.360(3)	1.058(0)	3.184(3)	1.059(0)	.6658
-2	7.373(26)	1.224(+3)	1.146(-86)	2.046(2)	1.057(0)	1.036(2)	1.070(0)	.6583
-1.5	4.324(27)	7.177(+3)	2.819(-27)	3.790(1)	1.056(0)	1.970(1)	1.097(0)	.6414
-1	2.759(28)	4.580(+4)	1.693(-8)	7.625(0)	1.053(0)	4.255(0)	1.175(0)	.5973
-0.5	2.164(29)	3.592(+5)	1.470(-2)	1.932(0)	1.075(0)	1.311(0)	1.460(0)	.4911
0	0	0	$\infty$	1.448(0)	$\infty$	1.615(0)	$\infty$	0.02988

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.  
<sup>†</sup> For  $\beta = 1$ ,  $T_0 = 5.930(0)$  and  $n_e = n_+ = 2.666(30)$ .

Table A.4.1\* (Continued)

IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED†

	$(\eta = 0)$									
$\log_{10} \beta$ ( $\beta = kT/m_e c^2$ )	$n_e - n_p$ ( $\text{cm}^{-3}$ )	$\rho_m \mu_e$ ( $\text{gm cm}^{-3}$ )	$n_e, n_e^{(m)}$	$P_e, (aT^4/3)$	$P_e, n_e^{(m)} kT$	$u_{e\pm}, aT^4$	$u_{e\pm}, (3n_e^{(m)} kT/2)$	$P_{e\pm}/u_{e\pm}$		
-6	1.687(21)	2.801(-3)	1.420(-868589)	5.021(8)	1.133(0)	2.510(8)	1.133(0)	0.6667		
-5	5.336(22)	8.857(-2)	1.659(-86859)	1.588(7)	1.133(0)	7.939(6)	1.133(0)	.6667		
-4	1.688(24)	2.801(0)	1.685(-8686)	5.022(5)	1.133(0)	2.511(5)	1.134(0)	.6666		
-3	5.348(25)	8.876(+1)	3.366(-869)	1.591(4)	1.133(0)	7.966(3)	1.135(0)	.6658		
-2	1.724(27)	2.861(+3)	1.804(-87)	5.122(2)	1.132(0)	2.595(2)	1.147(0)	.6580		
-1.5	1.014(28)	1.682(+4)	4.424(-28)	9.503(1)	1.129(0)	4.945(1)	1.175(0)	.6405		
-1	6.521(28)	1.082(+5)	2.635(-9)	1.920(1)	1.122(0)	1.075(1)	1.256(0)	.5952		
-0.5	5.276(29)	8.756(+5)	2.220(-3)	4.857(0)	1.109(0)	3.196(0)	1.459(0)	.5065		
0	5.569(30)	9.243(+6)	1.838(-1)	2.141(0)	1.465(0)	1.885(0)	2.579(0)	.3787		
+0.5	5.761(31)	9.562(+7)	1.276(0)	1.789(0)	3.740(0)	1.763(0)	7.371(0)	.3383		
+1	5.786(32)	9.603(+8)	4.995(0)	1.754(0)	1.155(1)	1.751(0)	2.306(1)	.3338		
+1.5	5.788(33)	9.607(+9)	1.684(+1)	1.750(0)	3.643(1)	1.750(0)	7.284(1)	.3334		
+2	5.798(34)	9.623(+10)	5.423(+1)	1.750(0)	1.150(2)	1.750(0)	2.299(2)	.3333		
+3	5.826(36)	9.670(+12)	5.441(+2)	1.750(0)	1.144(3)	1.750(0)	2.288(3)	.3333		
+4	4.978(38)	8.262(+14)	6.373(+3)	1.750(0)	1.339(4)	1.750(0)	2.678(4)	0.3333		

† Values of  $n_e$  are the same as in Table A.3.1.

Table A.4.1\* (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED  
 ( $\eta = 1$ )

$\log_{10} \beta$ ( $\beta = kT/m_e c^2$ )	$n_e^{(m)}(\text{cm}^{-3})$ $= n_e - n_+$	$\rho_m/\mu_e(\text{gm/cm}^3)$	$n_+/n_e^{(m)}$	$P_{e\pm}/(aT^4/3)$	$P_{e\pm}/n_e^{(m)}kT$	$u_{e\pm}/aT^4$	$u_{e\pm}/(3n_e^{(m)}kT/2)$	$P_{e\pm}/u_{e\pm}$
-6	3.475(21)	5.768(-3)	2.538(-868590)	1.159(9)	1.271(0)	5.796(8)	1.271(0)	0.6667
-5	1.099(23)	1.824(-1)	2.964(-86860)	3.666(7)	1.271(0)	1.833(7)	1.271(0)	.6667
-4	3.476(24)	5.769(0)	3.010(-8687)	1.160(6)	1.271(0)	5.799(5)	1.271(0)	.6666
-3	1.101(26)	1.828(+2)	6.013(-870)	3.674(4)	1.270(0)	1.840(4)	1.272(0)	.6657
-2	3.558(27)	5.906(+3)	3.215(-88)	1.184(3)	1.268(0)	6.006(2)	1.286(0)	.6574
-1.5	2.104(28)	3.492(+4)	7.841(-29)	2.204(2)	1.262(0)	1.150(2)	1.317(0)	.6388
-1	1.373(29)	2.279(+5)	4.603(-10)	4.490(1)	1.245(0)	2.531(1)	1.404(0)	.5913
-0.5	1.150(30)	1.908(+6)	3.749(-4)	1.155(1)	1.210(0)	7.643(0)	1.602(0)	.5038
0	1.461(31)	2.424(+7)	2.622(-2)	4.675(0)	1.219(0)	3.829(0)	1.997(0)	.4070
+0.5	2.796(32)	4.641(+8)	1.011(-1)	3.126(0)	1.346(0)	2.918(0)	2.514(0)	.3571
+1	7.139(33)	1.185(+10)	1.575(-1)	2.721(0)	1.452(0)	2.662(0)	2.840(0)	.3407
+1.5	2.092(35)	3.472(+11)	1.819(-1)	2.602(0)	1.498(0)	2.584(0)	2.976(0)	.3356
+2	6.422(36)	1.066(+13)	1.913(-1)	2.565(0)	1.521(0)	2.560(0)	3.036(0)	.3341
+3	6.383(39)	1.059(+16)	1.942(-1)	2.550(0)	1.522(0)	2.550(0)	3.043(0)	.3334
+4	6.376(42)	1.058(+19)	1.946(-1)	2.549(0)	1.522(0)	2.548(0)	3.045(0)	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

Table A.4.1\* (Continued)

IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED

 $(\eta = 3)$ 

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$n_e^{(m)}(\text{cm}^{-3})$ $= n_e - n_+$	$\rho_m/\mu_e(\text{gm/cm}^3)$	$n_+/n_e^{(m)}$	$P_{e\pm}/(aT^4/3)$	$P_{e\pm}/n_e^{(m)}kT$	$u_{e\pm}/aT^4$	$u_{e\pm}/(3n_e^{(m)}kT/2)$	$P_{e\pm}/u_{e\pm}$
-6	9.897(21)	1.643(-2)	1.206(-868591)	4.510(9)	1.736(0)	2.255(9)	1.736(0)	0.6667
-5	3.130(23)	5.195(-1)	1.408(-86861)	1.426(8)	1.736(0)	7.131(7)	1.736(0)	.6666
-4	9.900(24)	1.643(+1)	1.430(-8688)	4.511(6)	1.736(0)	2.256(6)	1.736(0)	.6665
-3	3.140(26)	5.212(+2)	2.855(-871)	1.430(5)	1.735(0)	7.162(4)	1.738(0)	.6655
-2	1.022(28)	1.696(+4)	1.515(-89)	4.631(3)	1.726(0)	2.356(3)	1.756(0)	.6552
-1.5	6.149(28)	1.021(+5)	3.630(-30)	8.709(2)	1.706(0)	4.589(2)	1.798(0)	.6327
-1	4.209(29)	6.986(+5)	2.033(-11)	1.828(2)	1.654(0)	1.054(2)	1.908(0)	.5779
-0.5	3.889(30)	6.454(+6)	1.500(-5)	5.016(1)	1.554(0)	3.436(1)	2.129(0)	.4866
0	5.724(31)	9.501(+7)	9.135(-4)	2.169(1)	1.443(0)	1.798(1)	2.393(0)	.4022
+0.5	1.274(33)	2.115(+9)	3.081(-3)	1.460(1)	1.380(0)	1.359(1)	2.570(0)	.3580
+1	3.539(34)	5.874(+10)	4.444(-3)	1.259(1)	1.355(0)	1.229(1)	2.646(0)	.3415
+1.5	1.072(36)	1.779(+12)	4.978(-3)	1.198(1)	1.347(0)	1.189(1)	2.673(0)	.3359
+2	3.342(37)	5.547(+13)	5.159(-3)	1.180(1)	1.344(0)	1.177(1)	2.682(0)	.3342
+3	3.323(40)	5.515(+16)	5.236(-3)	1.172(1)	1.343(0)	1.171(1)	2.686(0)	.3334
+4	3.321(43)	5.511(+19)	5.244(-3)	1.171(1)	1.343(0)	1.171(1)	2.686(0)	0.3333

Table A.4.1\* (Continued)  
 IDEAL FERMI-DIRAC EQUATION OF STATE, ELECTRON-POSITRON PAIRS INCLUDED†  
 ( $\eta = 5$ )

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$n_e^{(m)}$ ( $\text{cm}^{-3}$ ) $= n_e - n_+$	$\rho_m/\mu_e$ ( $\text{gm}/\text{cm}^3$ )	$n_+/n_e^{(m)}$	$P_{e\pm}/(aT^4/3)$	$P_{e\pm}/n_e^{(m)}kT$	$u_{e\pm}/aT^4$	$u_{e\pm}/(3n_e^{(m)}kT/2)$	$P_{e\pm}/u_{e\pm}$
-6	1.950(22)	3.327(-2)	8.280(-868593)	1.211(10)	2.365(0)	6.055(9)	2.365(0)	0.6667
-5	6.168(23)	1.024(0)	9.671(-86863)	3.829(8)	2.365(0)	1.915(8)	2.365(0)	.6666
-4	1.951(25)	3.239(+1)	9.820(-8690)	1.211(7)	2.365(0)	6.058(6)	2.365(0)	.6665
-3	6.195(26)	1.028(+3)	1.958(-872)	3.842(5)	2.362(0)	1.926(5)	2.368(0)	.6651
-2	2.038(28)	3.382(+4)	1.028(-90)	1.253(4)	2.342(0)	6.405(3)	2.394(0)	.6520
-1.5	1.254(29)	2.082(+5)	3.524(-31)	2.392(3)	2.297(0)	1.278(3)	2.453(0)	.6242
-1	9.111(29)	1.512(+6)	1.271(-12)	5.231(2)	2.187(0)	3.110(2)	2.600(0)	.5607
-0.5	9.404(30)	1.561(+7)	8.395(-7)	1.561(2)	1.999(0)	1.115(2)	2.857(0)	.4665
0	1.562(32)	2.592(+8)	4.537(-5)	7.464(1)	1.820(0)	6.378(1)	3.110(0)	.3901
+0.5	3.745(33)	6.216(+9)	1.424(-4)	5.362(1)	1.724(0)	5.058(1)	3.253(0)	.3534
+1	1.073(35)	1.781(+11)	1.993(-4)	4.753(1)	1.687(0)	4.661(1)	3.310(0)	.3399
+1.5	3.284(36)	5.450(+12)	2.210(-4)	4.566(1)	1.675(0)	4.538(1)	3.329(0)	.3354
+2	1.028(38)	1.706(+14)	2.283(-4)	4.508(1)	1.671(0)	4.499(1)	3.335(0)	.3340
+3	1.023(41)	1.698(+17)	2.313(-4)	4.484(1)	1.669(0)	4.483(1)	3.338(0)	.3334
+4	1.023(44)	1.697(+20)	2.316(-4)	4.481(1)	1.669(0)	4.481(1)	3.338(0)	0.3333

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

† Values of  $n_+$  are the same as in Table A.3.1.

Table A.4.2\*

 $n_+/n_e^{(m)}$  AS FUNCTION OF  $\eta$  AND  $\beta$ , IDEAL

$\log_{10}\beta$ ( $\beta = kT/m_e c^2$ )	$\eta = 10$	$\eta = 15$	$\eta = 20$	$\eta = 25$
-6	2.049(-868595)	7.566(-868598)	3.319(-868600)	1.602(-868602)
-5	2.393(-86865)	8.836(-86868)	3.876(-86870)	1.871(-86872)
-4	2.429(-8692)	8.967(-8695)	3.932(-8697)	1.897(-8699)
-3	4.828(-875)	1.777(-877)	7.765(-880)	3.734(-882)
-2	2.462(-93)	8.786(-96)	3.726(-98)	1.739(-100)
-1.5	5.413(-34)	1.817(-36)	7.278(-39)	3.222(-41)
-1	2.465(-15)	7.300(-18)	2.634(-20)	1.068(-22)
-0.5	1.294(-9)	3.275(-12)	1.058(-14)	3.953(-17)
0	5.721(-8)	1.297(-10)	3.917(-13)	1.400(-15)
+0.5	1.618(-7)	3.490(-10)	1.025(-12)	3.600(-15)
+1	2.176(-7)	4.612(-10)	1.342(-12)	4.683(-15)
+1.5	2.380(-7)	5.015(-10)	1.454(-12)	5.066(-15)
+2	2.448(-7)	5.148(-10)	1.491(-12)	5.191(-15)
+3	2.476(-7)	5.204(-10)	1.507(-12)	5.244(-15)
+4	2.479(-7)	5.209(-10)	1.508(-12)	5.250(-15)

\* Numbers in parentheses are the powers of ten by which the corresponding entries are to be multiplied.

(Continued)

## FERMI-DIRAC EQUATION OF STATE†

$\eta = 30$	$\eta = 40$	$\eta = 50$	$\eta = 60$	$\eta = 70$
8.216(-868605)	2.424(-868609)	7.878(-868614)	2.721(-868618)	9.805(-868623)
9.595(-86875)	2.831(-86879)	9.198(-86884)	3.177(-86888)	1.145(-86892)
9.728(-8702)	2.868(-8706)	9.312(-8711)	3.214(-8715)	1.157(-8719)
1.908(-884)	5.589(-889)	1.803(-893)	6.182(-898)	2.212(-902)
8.634(-103)	2.391(-107)	7.308(-112)	2.381(-116)	8.106(-121)
1.522(-43)	3.859(-48)	1.092(-52)	3.324(-57)	1.066(-61)
4.687(-25)	1.054(-29)	2.721(-34)	7.698(-39)	2.325(-43)
1.628(-19)	3.346(-24)	8.124(-29)	2.198(-33)	4.485(-38)
5.584(-18)	1.100(-22)	2.599(-27)	6.902(-32)	1.988(-36)
1.419(-17)	2.752(-22)	6.440(-27)	1.699(-31)	4.872(-36)
1.838(-17)	3.546(-22)	8.274(-27)	2.179(-31)	6.237(-36)
1.986(-17)	3.825(-22)	8.916(-27)	2.346(-31)	6.713(-36)
2.034(-17)	3.916(-22)	9.124(-27)	2.400(-31)	6.868(-36)
2.055(-17)	3.954(-22)	9.212(-27)	2.423(-31)	6.933(-36)
2.057(-17)	3.958(-22)	9.220(-27)	2.426(-31)	6.939(-36)

† The other quantities given in Table A.4.1, for  $\eta \geq 10$ , are the same (to four significant figures or better) as the corresponding quantities in Table A.3.1.

## *Emden Functions for $n = 1.5$ and $n = 3$*

Tables A.5.1 and A.5.2 give values of the Emden function  $\theta(\xi)$  and its first and second derivatives  $\theta'(\xi)$  and  $\theta''(\xi)$  for  $n = 1.5$  and  $n = 3$ . The notation is the same as that in Sect. 23.1a. These tables were obtained from the *British Association for the Advancement of Science Mathematical Tables, Vol. 2, 1932*.

Table A.5.1

EMDEN FUNCTIONS  $n = 1.5$ 

$\xi_1 = 3.65375\ 37$			$\theta'(\xi_1) = -0.20330\ 13$	
$\xi$	$\xi/\xi_1$	$\theta$	$\theta'$	$\theta''$
0.0	0.00000 00	1.00000 00	-0.00000 00	-0.33333 3
0.1	.02736 91	0.99833 46	.03328 34	.33183 5
0.2	.05473 82	.99335 33	.06626 80	.32736 7
0.3	.08210 73	.98510 07	.09866 01	.32000 1
0.4	.10947 65	.97365 05	.13017 56	.30985 9
0.5	0.13684 56	0.95910 39	-0.16054 49	-0.29710 8
0.6	.16421 47	.94158 81	.18951 69	.28195 1
0.7	.19158 38	.92125 47	.21686 30	.26463 0
0.8	.21895 29	.89827 65	.24237 98	.24541 4
0.9	.24632 20	.87284 56	.26589 23	.22459 5
1.0	0.27369 11	0.84516 98	-0.28725 55	-0.20248 0
1.1	.30106 02	.81546 99	.30635 57	.17938 7
1.2	.32842 94	.78397 68	.32311 09	.15563 4
1.3	.35579 83	.75092 76	.33747 11	.13153 8
1.4	.38316 76	.71656 31	.34941 73	.10740 4
1.5	0.41053 67	0.68112 43	-0.35896 02	-0.08352 0
1.6	.43790 58	.64484 99	.36613 87	.06015 8
1.7	.46527 49	.60797 33	.37101 73	.03756 2
1.8	.49264 40	.57072 02	.37368 39	- .01595 2
1.9	.52001 32	.53330 66	.37424 69	+ .00448 2
2.0	0.54738 23	0.49593 68	-0.37283 21	+0.02358 0
2.1	.57475 14	.45880 15	.36957 99	.04121 2
2.2	.60212 05	.42207 70	.36464 19	.05728 0
2.3	.62948 96	.38592 39	.35817 84	.07171 3
2.4	.65685 87	.35048 66	.35035 53	.08446 8
2.5	0.68422 78	0.31589 26	-0.34134 14	+0.09552 8
2.6	.71159 69	.28225 24	.33130 61	.10489 7
2.7	.73896 61	.24965 98	.32041 74	.11260 1
2.8	.76633 52	.21819 19	.30884 00	.11868 0
2.9	.79370 43	.18790 94	.29673 37	.12318 8
3.0	0.82107 34	0.15885 76	-0.28425 27	+0.12618 6
3.1	.84844 25	.13106 64	.27154 47	.12774 0
3.2	.87581 16	.10455 15	.25875 07	.12791 3

Table A.5.1 (Continued)

EMDEN FUNCTIONS  $n = 1.5$ 

$\xi_1 = 3.65375\ 37$			$\theta'(\xi_1) = -0.20330\ 13$	
$\xi$	$\xi/\xi_1$	$\theta$	$\theta'$	$\theta''$
3.30	0.90318 07	0.07931 46	-0.24600 63	+0.12675 7
3.35	.91686 53	.06717 24	.23969 37	.12569 1
3.40	.93054 99	.05534 42	.23344 26	.12429 9
3.45	.94423 44	.04382 68	.22726 93	.12257 5
3.50	.95791 90	.03261 57	.22119 09	.12050 4
3.55	0.97160 35	0.02170 58	-0.21522 52	+0.11806
3.56	.97434 04	.01955 95	.21404 73	.11752
3.57	.97707 73	.01742 49	.21287 49	.11696
3.58	.97981 43	.01530 20	.21170 82	.11638
3.59	.98255 12	.01319 07	.21054 74	.11578
3.60	0.98528 81	0.01109 10	-0.20939 27	+0.11516
3.61	.98802 50	.00900 28	.20824 43	.11452
3.62	.99076 19	.00692 61	.20710 24	.11384
3.63	.99349 88	.00486 07	.20596 75	.11314
3.64	.99623 57	.00280 67	.20483 97	.11240
3.65	0.99897 26	0.00076 39	-0.20371 96	+0.11161
$\xi_1$	1.00000 00	0.00000 00	-0.20330 13	+0.11128

*Table A.5.2*  
EMDEN FUNCTIONS  $n = 3$

$\xi_1 = 6.89684\ 86$			$\theta'(\xi_1) = -0.04242\ 98$	
$\xi$	$\xi/\xi_1$	$\theta$	$\theta'$	$\theta''$
0.0	0.00000 00	1.00000 00	-0.00000 00	-0.33333 3
0.1	.01449 94	0.99833 58	.03323 36	.33034 5
0.2	.02899 88	.99337 31	.06587 38	.32151 2
0.3	.04349 81	.98519 98	.09735 40	.30722 7
0.4	.05799 75	.97395 83	.12715 77	.28810 3
0.5	0.07249 69	0.95983 91	-0.15483 96	-0.26493 3
0.6	.08699 63	.94307 32	.18003 96	.23862 5
0.7	.10149 56	.92392 28	.20249 21	.21014 3
0.8	.11599 50	.90267 21	.22202 77	.18044 3
0.9	.13049 44	.87961 72	.23857 03	.15042 7
1.0	0.14499 38	0.85505 76	-0.25212 93	-0.12089 4
1.1	.15949 31	.82928 81	.26278 79	.09252 1
1.2	.17399 25	.80259 19	.27069 01	.06584 2
1.3	.18849 19	.77523 56	.27602 62	.04125 3
1.4	.20299 13	.74746 48	.27901 92	-.01901 2
1.5	0.21749 06	0.71950 18	-0.27991 17	+0.00074 2
1.6	.23199 00	.69154 41	.27895 50	.01797 4
1.7	.24648 94	.66376 41	.27639 94	.03273 3
1.8	.26089 88	.63630 94	.27248 72	.04512 8
1.9	.27548 81	.60930 42	.26744 72	.05531 8
2.0	0.28998 75	0.58285 05	-0.26149 09	+0.06348 8
2.1	.30448 69	.55703 02	.25481 03	.06984 0
2.2	.31898 63	.53190 69	.24757 67	.07458 0
2.3	.33348 56	.50752 82	.23994 12	.07791 3
2.4	.34798 50	.48392 77	.23203 45	.08003 3
2.5	0.36248 44	0.46112 66	-0.22396 89	+0.08112 2
2.6	.37698 38	.43913 60	.21583 89	.08134 7
2.7	.39148 31	.41795 83	.20772 34	.08085 6
2.8	.40598 25	.39758 87	.19968 70	.07978 4
2.9	.42048 19	.37801 65	.19178 20	.07824 6
3.0	0.43498 13	0.35922 65	-0.18404 99	+0.07634 4
3.1	.44948 06	.34119 97	.17652 25	.07416 4
3.2	.46398 00	.32391 44	.16922 39	.07178 0
3.3	.47847 94	.30734 67	.16217 13	.06925 3
3.4	.49297 88	.29147 15	.15537 63	.06663 6

Table A.5.2 (Continued)

EMDEN FUNCTIONS  $n = 3$ 

$\xi_1 = 6.89684\ 86$			$\theta'(\xi_1) = -0.04242\ 98$	
$\xi$	$\xi/\xi_1$	$\theta$	$\theta'$	$\theta''$
3.5	0.50747 82	0.27626 26	-0.14884 58	+0.06397 0
3.6	.52197 75	.26169 34	.14258 27	.06129 1
3.7	.53647 69	.24773 72	.13658 71	.05862 6
3.8	.55097 63	.23436 72	.13085 62	.05599 8
3.9	.56547 57	.22155 73	.12538 56	.05342 5
4.0	0.57997 50	0.20928 16	-0.12016 91	+0.05091 8
4.1	.59447 44	.19751 52	.11519 94	.04848 9
4.2	.69897 38	.18623 38	.11046 84	.04614 5
4.3	.62347 32	.17541 39	.10596 74	.04389 0
4.4	.63797 25	.16503 29	.10168 74	.04172 7
4.5	0.65247 19	0.15506 93	-0.09761 90	+0.03965 7
4.6	.66697 13	.14550 24	.09375 28	.03768 2
4.7	.68147 07	.13631 24	.09007 95	.03579 9
4.8	.69597 00	.12748 04	.08659 00	.03400 7
4.9	.71046 94	.11898 85	.08327 51	.03230 5
5.0	0.72496 88	0.11081 98	-0.08012 60	+0.03068 9
5.1	.73946 82	.10295 81	.07713 44	.02915 7
5.2	.75396 75	.09538 80	.07429 19	.02770 6
5.3	.76846 69	.08809 50	.07159 06	.02633 2
5.4	.78296 63	.08106 54	.06902 31	.02503 1
5.5	0.79746 57	0.07428 62	-0.06658 20	+0.02380 2
5.6	.81196 50	.06774 50	.06426 05	.02263 9
5.7	.82646 44	.06143 03	.06205 20	.02154 1
5.8	.84096 38	.05533 11	.05995 03	.02050 3
5.9	.85546 32	.04943 69	.05794 95	.01952 3
6.0	0.86996 25	0.04373 80	-0.05604 39	+0.01859 8
6.1	.88446 19	.03822 51	.05422 82	.01772 4
6.2	.89896 13	.03288 95	.05249 75	.01689 9
6.3	.91346 07	.02772 29	.05084 69	.01612 1
6.4	.92796 01	.02271 76	.04927 19	.01538 6
6.5	0.94245 94	0.01786 62	-0.04776 83	+0.01469 2
6.6	.95695 88	.01316 17	.04633 22	.01403 8
6.7	.97145 82	.00859 76	.04495 96	.01342 0
6.8	0.98595 76	.00416 78	.04364 70	.01283 7
$\xi_1$	1.00000 00	.00000 00	.04242 98	.01230 4