Errata for "Heat Conduction using Green's Functions"

Hemisphere, 1992

January 2002

Chapter I

Page	Error	Correction
xvi	$\alpha \dots W/m^2$	$\alpha \dots m^2/s$
xxvi, Eq. (I.32)	$q_i = +\sum \dots$	$q_i = -\sum \dots$
xxvii, Eq. (I.34)	$\nabla \cdot (k \nabla T)$	$-k \nabla T$
xxvii, Eq. (I.35)	$-k \nabla^2 T$	$-\nabla \cdot (k \nabla T)$

Chapter 1

Page	Error	Correction
1, 2nd line	(1773-1841)	(1793-1841)
9, Eq. (1.13)	$\frac{T_1}{2}$	$-\frac{T_1}{2}$
15, ex. 1.4	$\frac{1}{\alpha}\frac{\partial^2 T}{\partial x^2}$	$\alpha\frac{\partial^2 T}{\partial x^2}$
17, ex. 1.5 (same error in two places)	$\frac{1}{\alpha}\frac{\partial^2 T}{\partial x^2}$	$\alpha\frac{\partial^2 T}{\partial x^2}$
19, 5th line from bottom	$= G(x', -t \mid x, -\tau)$	$= G(x', -\tau \mid x, -t)$
22, Prob. 1.7	$T = x^2 + T_0$	$T = T_1(x/L)^2 + T_0$

Chapter 2

Page	Error	Correction
25, Eq. (2.4)	$f_i(r_i, t)$	$f_i(\mathbf{r}_i, t)$
25, Eq. (2.8)	$h_i T \mid$	$h_i T \mid_{r_i}$
28, Table 2.2, fifth line	$f(t) = Ct^p$	$f(t) = Ct^p, p > 1$
30, Fig. 2.4 (d), far right boundary	T	$T = t$
32, Fig 2.6 caption	X33 ... B0x5	X33 ... B0y5
37, Prob. 2.10b	$-\partial C/\partial x$	$\partial C/\partial x$

Chapter 3

Page	Error	Correction
40, Eq. (3.4c)	$G(x, t = 0\|x', \tau) = 0$	$G(x, t\|x', \tau) = 0$
42, Eq. (3.12),(3.13) and (3.15) (3 places)	∂n_i	$\partial n_i'$
42, above Eq. (3.15)	$T = f_i(t)$	$T = f_i(\tau)$
43, Eq. (3.16) third line	x_i	x_i'
43, Eq. (3.18)	$-k\frac{\partial T}{\partial x}$	$+k\frac{\partial T}{\partial x}$
44, Fig. 3.1	$-k\frac{\partial T}{\partial x}$	$+k\frac{\partial T}{\partial x}$
45, Fig. 3.2	$= h(T\|_{x=0} - T_\infty)$	$= h(T_\infty - T\|_{x=0})$
49, 2nd line	left side ...	right side ...
50, Eq. (3.40)	$T\frac{\partial G}{\partial n_i}$	$T\frac{\partial G}{\partial n_i'}$
51, above Eq. (3.46b)	... term is	... term is (with $k_i \to k$)
51, Eq. (3.46b)	replace k_i	k
56, Eq. (3.60)	$h_i T^*$	$h_i T^*\|_{r_i}$
57, Eq. (3.65)	$k_i \frac{\partial T'}{\partial n_i} + h_i T' = (\rho c b)_i \frac{\partial T'}{\partial t}$	$k_i \left.\frac{\partial T'}{\partial n_i}\right\|_{r_i} + h_i T'\|_{r_i}$ $= (\rho c b)_i \left.\frac{\partial T'}{\partial t}\right\|_{r_i}$
58, 4th line	$T'(L, t) = (T_l \ldots$	$T'(L, t) = (T_L \ldots$
58, Eq. (3.67a)	$(T_L - T_0)\frac{2\pi a}{\omega L^2}$	$(T_L - T_0)\frac{2\pi\alpha}{\omega L^2}$
59, 4th line from bottom	$m^2\pi^2\alpha(\ldots$	$m^2\pi^2\alpha/(\ldots$
62, Eq. (3.80)	$W(r, t)$	$W(r, t)\|_{r_i}$
62, Eq. (3.81)	$2w\ dx$	$2wh\ dx$
63, below Eq. (3.84)	For the problem at hand the boundary	The initial and boundary
63, below Eq. (3.84)	$\theta(x, 0) = T_0 - T_\infty$ $\theta(0, t) = 0$	$\theta(x, 0) = 0$ $\theta(0, t) = T_0 - T_\infty$
63, Eq. (3.85)	$W(x, 0) = (T_0 - T_\infty)e^{m^2\alpha t}$ $W(0, t) = 0$	$W(x, 0) = 0$ $W(0, t) = (T_0 - T_\infty)e^{m^2\alpha t}$

Chapter 3, continued

Page	Error	Correction
64, Eq. (3.87)	$\frac{2\pi}{L}$	$\frac{2\pi}{L^2}$
64, below Eq. (3.87) and Eq. (3.88)	$\frac{2\pi}{L}$	2π
64, below Eq. (3.87) and Eq. (3.88)	$(m^2+n^2\pi^2)^{-1}$	$(m^2L^2+n^2\pi^2)^{-1}$
66, Eq. (3.94), last line	$f_j(\mathbf{r}_\mathrm{j})$	$f_j(\mathbf{r}'_\mathrm{j})$
67, below Eq. (3.99)	$d(sinh\ z)dz$	$d(sinh\ z)/dz$
69, Eq. (3.108a)	$= T_{x\infty 1}(x,y,t)\ldots$	$= h_{x1}T_{x\infty 1}(x,y,t)\ldots$
70, Eq. (3.113)	L_x, two places	L
70, Eq. (3.113)	$(V^2t)/(2\alpha)$	$(V^2t)/(4\alpha)$
70, Eq. (3.114)	$(V^2t)/(2\alpha)$	$(V^2t)/(4\alpha)$
71, Eq. (3.122)	$T_{x2}(y',z',\tau)e^{V^2\tau/(4\alpha)}$	$T_{x2}(y',z',\tau)e^{-VL/(2\alpha)+V^2\tau/(4\alpha)}$
71, Eq. (3.123)	$T_{x2}(\tau)e^{VL/(4\alpha)+V^2\tau/(4\alpha)}$	$T_{x2}(\tau)e^{VL/(2\alpha)+V^2\tau/(4\alpha)}$
74, Reference	*... Conduction*	*... Conduction, Ill-Posed Problems*
75, Prob. 3.17a	$y' = y(k_y/k_x)^{1/2}$	$y' = y(k_x/k_y)^{1/2}$
75, Prob. 3.17a	$b' = b(k_y/k_x)^{1/2}$	$b' = b(k_x/k_y)^{1/2}$
76, 3rd line from bottom	$\frac{\partial T}{\partial t}$	$\frac{\partial W}{\partial t}$
77, 1st paragraph, 10th line	"but the equations can be performed"	"but the integrations can be performed"

Chapter 4

Page	Error	Correction
	$0.0000 - \|-$	$10^{-5} - \|-$
81 and 82, Fig. 4.2 and 4.3	$0.0000 - \|-$	$10^{-6} - \|-$
	$0.0000 - \|-$	$10^{-7} - \|-$
82, 2nd line below Eq. 4.3	$L[f(t)]$	$\mathcal{L}[f(t)]$
84, Eq. (4.12b)	$s\overline{T}(x,s) - sT(x,0)$	$s\overline{T}(x,s) - T(x,0)$
85, below Eq. (4.17)	"given by Eq. (6.16)"	"given by Eq. (1.39)"
86, Eq. (4.19b)	$= 0$	is finite
87, Eq. (4.28b)	$= 0$	is finite
88, Eq. (4.33)	$\dfrac{\partial rG}{\partial t}$	$\dfrac{\partial G}{\partial t}$
91, line 23 and 24	... one insulated boundary (X21)	... two insulated boundaries (X22)
94, Eq. (4.70), right side	$0 \;\; m = n$	$0 \;\; m \neq n$
97, below Eq. (4.86)	"with C = 0 . . ."	"with B = 0 . . . "
97, Eq. (4.87),	$e^{-\beta_m \alpha t/L^2} n$	$e^{-\beta_n^2 \alpha t/L^2}$
98, Eqs. (4.92) and (4.93)	$e^{-\beta_m \alpha t/L^2} n$	$e^{-\beta_n^2 \alpha t/L^2}$
98, Eq. (4.95a)	$e^{-\beta_n \alpha ...}$	$e^{-\beta_n^2 \alpha ...}$
98, 6th line below Eq. (4.95b)	$exp[-\beta_n^2 \alpha t/L^2]$	$exp[-\beta_n^2 \alpha (t-\tau)/L^2]$
99, Table 4.2, caption	$e - \beta_m^2 \alpha (t-\tau)/L^2$	$exp[-\beta_m^2 \alpha (t-\tau)/L^2]$
110, Eq. (4.124)	quotient line [— -]	[———]
112, Eq. (4.129)	should be one piece $[\dfrac{-x^2+y^2+z^2}{4\alpha(t-\tau)}]$	$[-\dfrac{(x^2+y^2+z^2)}{4\alpha(t-\tau)}]$
114, below Eq. (4.133)	$du = t - \tau$	$u = t - \tau$

Chapter 5

Page	Error	Correction
126, Table 5.3, Eq. 1., 2nd line	$\left\{erfc\left[\frac{z}{(4\alpha t)^{1/2}}\right]\right.$ $\left.-erfc\left[\frac{z+L}{(4\alpha t)^{1/2}}\right]\right\}$ $+2\frac{\alpha t}{L}[2K\ldots$	$\left\{erfc\left[\frac{z+L}{(4\alpha t)^{1/2}}\right]\right.$ $\left.-erfc\left[\frac{z}{(4\alpha t)^{1/2}}\right]\right\}$ $+2\frac{\alpha t}{L}[K\ldots$
129, Eq. (5.21b)	$i^0erfc(u)$	(delete this term)
136, bottom line	$]^2\}du$	$]\}^2du$
139, prob. 5.1	"Eq. (5.11) with $m = 1$."	"Eq. (5.11) with $\beta_m = m\pi$."

Chapter 6

Page	Error	Correction
143, Table 6.1, 2nd line	$-\frac{1}{L}\{MD_1L\ ER\ldots\}$	$\{MD_1\ ER\ldots\}$
143, middle of Table 6.1	$S_1 = \frac{L}{2C_1}[\ldots],\ C_1 < \frac{1}{4}B_1$	$S_1 = \frac{1}{2C_1L}[\ldots],\ C_1 < \dfrac{1}{4B_1}$
143, middle of Table 6.1	$S_2 == \frac{L}{2C_1}[\ldots]$	$S_2 = \frac{1}{2C_1L}[\ldots]$
146, Table 6.3	case X40B1T00, $E_1 = 1$	case X40B1T00, $E_1 = 0$
147, Table 6.4, column 2	$erf[(4z)^{1/2}]$	$erf[(4z)^{-1/2}]$
152, Figure 6.5	Wrong figure.	Correct figure below ↓
156, Eq. (6.42a), 2nd line	$+2\,erfc\left[\frac{L+x}{(4\alpha t)^{1/2}}\right]$	$+erfc\left[\frac{L+x}{(4\alpha t)^{1/2}}\right]$
157, Eq. (6.42b), 1st line	$-2\,erfc\left[\frac{2L-x}{(4\alpha t)^{1/2}}\right]$	$+2\,erfc\left[\frac{2L-x}{(4\alpha t)^{1/2}}\right]$
157, above Eq. (6.43)	Eqs. (6.42a) and (6.42b)	Eq. (6.42a), Eq. (6.42b) and the $n = 1$ term
158, 2nd line of Eq. (6.44b)	$L \bullet x << L$	$(L - x) << L.$

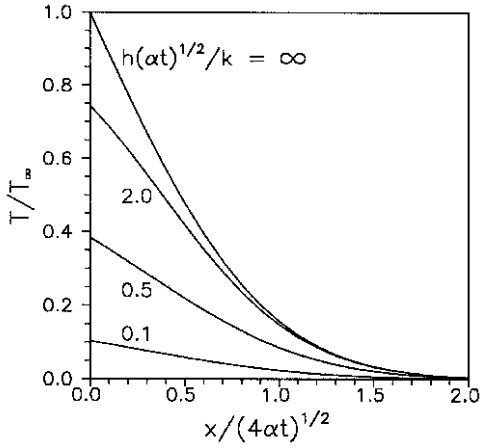

Figure 1: 6.5, page 152. Temperature in a semi-infinite body with surface convection for $h(\alpha t)^{1/2}/k = 0.1,\ 0.5,\ 2.0,\ \infty$.

Chapter 6, continued

Page	Error	Correction
160, 3rd line below Eq. (6.54)	in Table 4.2	in Table 4.3
161, 2nd line below Eq. (6.56)	$-\beta_m \alpha t/L^2$	$\beta_m^2 \alpha t/L^2$
161, 9th line below Eq. (6.56)	$-\beta_m \alpha t/L^2$	$\beta_m^2 \alpha t/L^2$
161, Eq. (6.57), **3 places**	$\frac{\beta_m \alpha t}{L^2}$	$\frac{\beta_m^2 \alpha t}{L^2}$
161, Eq. (6.58)	$m \leq (\ )^{1/2}$	$m > (\ )^{1/2}$
161, 2nd line below Eq. (6.58)	$m \leq 8$	$m > 8$
166, Eq. (6.78), third line	$[\frac{1}{2}(\frac{x'}{L})^2 - \frac{x'}{L}]$	$[\frac{1}{2}(\frac{x'}{L})^2 - \frac{x'}{L} + \frac{\alpha t}{L^2}]$
166, end of Eq. (6.78)	}	]
178, Eq. (6.115d)	$\left.\frac{\partial T}{\partial x}\right\|_{y=0} = 0$	$\left.\frac{\partial T}{\partial y}\right\|_{y=0} = 0$
178, Eq. (6.116), 2nd line	$(\ )\|_{y'=0}$	$(\ )\|_{y'=b}$
178, Eq. (6.117)	$G_{X21Y21}(x,t\|x',\tau)$	$G_{X21Y21}(x,y,t\|x',y',\tau)$
187, Caption to Fig. 6.13	$\|P\| > 1$	$\|p\| > 1$
189, Caption to Fig. 6.15	$O(X,Y)$	$\theta(X,Y)$
193, Eq. (6.170), first line	$-\sum_{m-1}^{\infty} \frac{2L}{\|x-x'\|}$	$+\sum_{m-1}^{\infty} \frac{1}{\pi(m-\frac{1}{2})}$
194, Eq. (6.171)	$-\frac{q_o}{k}$	$+\frac{q_o}{k}$
194, Eq. (6.171)	$\sum_{m-1}^{\infty}$	$\sum_{m=1}^{\infty}$
194, Eq. (6.172), last line only	$-exp[-\pi(m-\frac{1}{2})\frac{x-9}{L}]$	$-exp[+\pi(m-\frac{1}{2})\frac{x-a}{L}]$
194, Eq. (6.172), 2 places	$\frac{2q_oL}{k}$	$\frac{q_oL}{k}$
194, Eq. (6.172), FOUR places	$\|x\| - 9$	$\|x\| - a$
	$\|x\| + 9$	$\|x\| + a$
	$x + 9$	$x + a$
	$x - 9$	$x - a$
197, 2nd line	hL/x	hL/k

Chapter 7

Page	Error	Correction
204, 3rd line below Eq. (7.8)	"The Eq. (7.5). . . "	"Then Eq. (7.5). . ."
207, Eq. (7.19)	(missing M definition)	where M is a finite constant.
214, Eq. (7.58)	$\dfrac{\partial T(0,t)}{\partial r} = 0$	$T(0,t)$ is finite
215, Eq. (7.61) and (7.62)	$=$	$\approx$
216, Eq. (7.66) and (7.67)	$\dfrac{1}{\beta_n J_n(\beta_n)}$	$\dfrac{1}{\beta_n^3 J_n(\beta_n)}$
224, Prob. 7.8, 2nd exp term	$exp\left[-\dfrac{(r-r')^2}{4\alpha(t-\tau)}\right]$	$exp\left[-\dfrac{(r+r')^2}{4\alpha(t-\tau)}\right]$

Chapter 8

Page	Error	Correction
230, in Fig. 8.4 and 8.5	∂	δ
233, below Eq. (8.13d)	R01B1T0 Z11B11	R01B1 Z11B11 T1
233, Fig 8.6	$T = T_0$, three places	$T = T_1$, three places
233, Fig 8.6 Caption	R01B1T0 Z11B11	R01B1 Z11B11 T1
235, above Eq. (8.35)	$r \approx 1$	$r \approx a$
239, Eq. (8.36)	$2\dfrac{\alpha t}{a^2}$	$2\left(\dfrac{\alpha t}{a^2}\right)^{1/2}$
240, Eq. (8.39)	$\dfrac{1}{2\sqrt{\pi}t^+}$	$\dfrac{1}{2\sqrt{\pi t^+}}$
243, Fig. 8.10, on the bottom axis	"10^4 10^3 .01"	"10^{-4} 10^{-3} 10^{-2}"
248, Eq. (8.64)	$\dfrac{1}{B_2}$	$\dfrac{1}{2B_2}$

Chapter 9

Page	Error	Correction
253, Eq. (9.2)	$(r^2\frac{\partial T}{\partial t})$	$(r^2\frac{\partial T}{\partial r})$
258, Fig. 9.2, 2 labels	$dV = r^2 \sin\theta\, d\theta\, dr$	$dV = r^2 \sin\theta\, d\theta\, dr\, d\phi$
	$r \sin\theta\, d\theta$	$r \sin\theta\, d\phi$
273, 5th line on page	Table 2.8	Table 5.8
283, Eq. (9.118), 2nd line	$(b-r)(b-a)$	$(b-r)/(b-a)$
284, Eq. (9.121)	$2\pi\alpha a$	$2\pi\alpha a T_\infty$
287, 3rd line on page	"large-time form of G_{RS10}"	"Green's function"

Chapter 10

Page	Error	Correction
310, Eq. (10.68)	$\frac{\partial t}{\partial n}$	$\frac{\partial T}{\partial n}$
328, last line	Setting $\beta_2 = h_2/k_2$	Setting $B_2 = h_2/k$

Appendix B

Page	Error	Correction
410, Eq. (B.20c)	$= W_v(z)$	$W_v'(z)$

Appendix E

Page	Error	Correction
414, 1st line	One way to expand $erf(x)$ is ...	Two ways to expand $erf(x)$ are

Appendix F

Page	Error	Correction
423, add to last line on page		(continued next page)
424, Eq. 10	(Barber)	(erase this citation)
426, Table F.5, No. 1, 2nd line	$e^{-4ab}erfc(a\sqrt{x} - b/\sqrt{x})$	$e^{-4ab}erfc(a\sqrt{x} - b/\sqrt{x}))$
427, Table F.6, No. 1	$erfc(\ldots)$	$erf(\ldots)$
427, Table F.6, No. 6, 2nd line	$-2a\sqrt{\pi}(1 + \ldots)$	$= -2a\sqrt{\pi}(1 + \ldots)$

Appendix R

Page	Error	Correction
431, above Eq. (R00.1a)	(missing heading)	R00 Infinite Body
436, below table	or $u > 0.55$	for $u > 0.55$
437, heading below 2nd para.	E. 4	R.4
440, Eq. (R02.9)	$\left(\frac{a}{b}\right)^2 + \frac{a}{b}\sum$	$\left(\frac{a}{b}\right)^2 + \frac{2a}{b}\sum$
441, Eq. (R10.1)	$e^{-\beta^2(t-\tau)/a^2}$	$e^{-\alpha\beta^2(t-\tau)/a^2}$
443, 1st line	$kGT/\partial r$	$k\partial G/\partial r$
444, 3rd line	$G_{R20}(a,t\|a,\tau)$:	$G_{R20}(a,t\|a,\tau)$ are given below.
444, Eq. (R20.6)	$\int_0^\infty$	$\int_a^\infty$
445, 1st line	Exact $2\pi G_{R20}(\ldots)$	Exact $2\pi a^2 G_{R20}(\ldots)$

Appendix RΦ

Page	Error	Correction
454, Eq. (R02Φ12.1)	$\dot{m}$	[
457, 5th line below R23Φ00	$-\{1-[nb/(\beta_{mn}g)]^2\}V_{mn}^2$	$-\{1-[nb/(\beta_{mn}a)]^2\}V_{mn}^2$
458	(add at bottom of page)	where R_v, $N(\beta_{mn})$, β_{mn}, $N(\upsilon)$, and Φ are given in tables RΦ.1–RΦ.4

Appendix RS

Page	Error	Correction
464, Table RS.1	replace RS30 case with:	$\frac{1}{r'} - \frac{B_1 a}{(1+B_1)rr'};\ r < r'$ $\frac{1}{r} - \frac{B_1 a}{(1+B_1)r'r};\ r > r'$
465, Eq. (RS02.3), 4th line	$2b - r - r$	$2b - r - r'$
465, RS03	$+h_2 G = 0\ r = b$	$+h_2 G = 0$ at $r = b$
466, center of page	RS11 $\ldots T = 0$	RS11 $\ldots G = 0 \ldots$
466, Eq. (RS11.1), 2nd line	$2n(b-a) + r - r')^2$	$(2n(b-a) + r - r')^2$
468, Eq. (RS12.5), 3rd line	$(2b - r - r)$	$(2b - r - r')$
469, Eq. (RS22.1), 3rd line	$\cos[\beta(r'-a)/(b-a)]$	$\cos[\beta_m(r'-a)/(b-a)]$
470, above Eq. (RS23.1)	$G(r,t\|\theta',\tau)$	$G(r,t\|r',\tau)$
471, Eq. (RS33.1b)	$B_1 = \frac{h_1 a}{k} + 1$	$B_1 = \left(\frac{h_1 a}{k} + 1\right)\frac{b}{a}$
472, above references	Table R0.1	Table R0Φ.1, p. 459
	Table R0.2	Table R0Φ.2, p. 459
	Table R0.3	Table R0Φ.3, p. 460

Appendix X

Page	Error	Correction
482, Eq. (X11.5)	$\ldots] \; t - \tau > 0$	$\ldots], \;\; t - \tau > 0$
483, Eq. (X11.13)	$\ldots L^2 \; t - \tau > 0$	$\ldots L^2, \;\; t - \tau > 0$
485, Eq, (X12.3)	$G_{X12}(L, t, L, \tau) =$	$G_{X12}(L, t\|L, \tau) \approx$
486, Eq. X13 Plate	$k\partial G/\partial x + hT = 0$	$k\partial G/\partial x + hG = 0$
486, Eq. (X13.1), 3rd line	$(2L - x-')^2$	$(2L - x - x')^2$
487, Eq. (X14.1)	$G_{X14}(x, t\|x', \tau) =$	$G_{X14}(x, t\|x', \tau) \approx$
493, Fig. X20.1 caption	0.5 and 1.0	0.1, 0.25, 1.0, and 10.
497, 1st equation, unnumbered	(no number)	(X23.7)
501, Eq. (X30.11)	$= \exp[\ldots]$	$= 1 + \exp[\ldots]$
502, Eq. (X31.6)	$\sum_{m=0}^{\infty}$	$\sum_{m=1}^{\infty}$
503, Eq. (X33.2)	$+B_1 \sin(\beta_m x/l)$	$+B_1 \sin(\beta_m x/L)$
503, above Eq. (X33.4)	relations	relation
504, equation numbers	(X33.5) and (X33.5)	(X33.5a) and (X33.5b)

Author Index

Page	Error	Correction
521	Amos, D., 435, 449	Amos, D., 436, 450