Corrections to
"Numerical and Analytical Methods for Scientists and Engineers, using *Mathematica*"

page no./location	**Correction**	**Corrected in 2nd printing?**	**Error on cd?**
Several places throughout the book and index	Neumann boundary conditions, named after Carl Gustav Neumann, are referred to incorrectly as von Neumann boundary conditions.	yes	yes
inside front cover	Planck constant: 6.6261×10^{-34} Joule-second	no	yes
inside front cover	Earth-sun distance: 1.50×10^{11} meters	no	yes
inside front cover	Earth-moon distance: 3.84×10^{8} meters	no	yes
inside front cover	1 Angstrom (A) = 10^{-10} meter	yes	yes
inside front cover	gravitational constant	no	yes
6/Eqn. after (1.2.1)	$d^{N-1}x / dt^{N-1} = u_o$	no	no
14/line 17	… properties of chaotic systems would take us too far afield, …	no	no
14/ (2a)	$\frac{dy}{dt} = \sqrt{t}\, y^2$	no	no
14/ (2b)	$-8<y<8$	no	yes
17/3rd line after Eq. (1.3.1)	`x''[t] == ` $-\omega_0^2$`x[t]`	no	no
18/3rd line after Cell 1.10	…square of the natural frequency…	no	yes
21/ (3b)	R = 10 ohms,…	yes	yes
23/(8a)	Make a table of plots of these field lines in the (ρ, z) plane and superimpose them all with a **`Show`** command to visualize the field lines from the dipole. (Hint: Show that $dz / d\rho = E_z / E_\rho$ and solve this ODE for $z(\rho)$ using **`DSolve`**. Plot the resulting curves in the (ρ, z) plane for the given initial conditions: $z(1) = 0.5n$.)	no	yes
23/(8b)	…, the dipole potential has the form $\phi(r,\theta) = (\cos\theta) / r^2$.	no	no
31/ 6th line from bottom	The same notation is / used in power series	yes	no
35/3rd line after Cell 1.36	After the plots were overlaid…	yes	yes
56/ (11)(c)	r=28; x(0)=y(0)=z(0)=1. What are x(3) and x(20)?	yes	yes
59/(1.4.33)	$\mathbf{F}_{ij}(\mathbf{r}) = q_i q_j \mathbf{r} / 4\pi\varepsilon_o r^3$	no	yes
61/Cell 1.67	**`F[i_,j_,r_¥] := …`**	no	no
63/line above (1.5.4)	$C_2 = (H / T + gT / 2)$	no	yes
63/(1.5.4)	$y(t) = (H / T + gT / 2)t - gt^2 / 2$	no	yes

66/Cell 1.75	`yend[v0_] := (y[t1]/.Sol[v0][[1]])/; v0 ε Reals` (The conditional statement is explained in the electronic edition.)	yes	yes
70/ Eq. (1.62)	$\frac{d^2x}{dt^2}+\gamma\frac{dx}{dt}+\omega_0^2x=f(t)$	yes	no
85/ (8)	Eq. (1.3.3)	yes	yes
85/(8a)	…using the method of complex exponentials, $Q_p(t)=\mathrm{Re}(Q_0e^{-i\omega t})$.	no	yes
99/line above (2.1.17)	$n = Ms$	no	yes
110/ (6)	$x'' + 16\pi^2x = f(t)$	yes	yes
111/ (10)	**`Sin[440 2 π t + φ[t]]`**	yes	yes
112/ Eq. (2.2.3)	$\mathbf{e}^{+i\,n\,\Delta\omega\,t}$	yes	no
113/ Cell 2.31	~~`f(p)(t) for f(t) = t² on 0<t<1`~~	yes	no
113/2nd line after Cell 2.30	…approximation to the complete series exhibits the…	yes	no
114/2 lines above (2.2.5)	Since ~~the function~~ $f_e(t)$ is even…	no	yes
115/Cell 2134	`f`$_{\mathrm{approx}}$`[t_,M_]:=    ...`	no	yes
120/1st line after Eq. (2.2.18)	$(\mathbf{e}^{i\,2\,\pi\,n\,x/L})^*$	yes	no
126 /axis label	Re[f[ω]] => Im[f[ω]]	yes	no
133/top of pg.	$\tilde{h}(\omega)=\int_{-\infty}^{\infty}dt_2\ldots$	no	no
134/Cell 2.53	$e^{-\frac{1}{4}\Delta t^2\omega^2}$	no	no
136/before (2.3.30)	… consider integrals over Dirac δ-functions of the form	no	no
138/4th line	~~[~~sin(Δω t)	yes	no
139/9th line	sense of the term	yes	no
142/Cell 2.59	`PlayRange->All];`	yes	no
148/Cell 2.60	`F1 = Table[Exp[-I 2. Pi m n/nn],`	yes	yes
149/line 7	Since $\omega = 0$	yes	no
160/center of page	$(i\ \omega_+ + s_1)$	yes	no
163/center of page	sum of the solutions	yes	no
164/ (9)(a)	$h(t+\Delta t)-h(t-\Delta t)$	yes	no
165 (11)(b)	$\int_{-\infty}^{\infty}t/(ia+t)e^{i\omega t}dt$	no	no
166/Table 2.2	Data for Exercise (15)	no	yes
167/(20a)	Find a Green’s function for the following operator:	no	yes
172/line 1	Since $g=0$ for $t\le t_0$ and g is continuous at $t=t_0$, all terms…	no	yes
174/line after (2.4.14)	Also, the Green’s function itself is continuous (if $N>1$),	no	yes

175/(2.4.20)	$\frac{x(t_n)-x(t_{n-1})}{\Delta t}+u_0(t_{n-1})x(t_{n-1})=f(t_{n-1}), \quad n>0$	no	yes
177/Cell 2.91	`Clear[u,Δt];`	yes	no
182/Table 2.4, 5th row	$\rho(x_{n-2}) \Rightarrow \phi(x_{n-2})$	yes	no
184/line 2	$\phi(x_o) = V_a$	yes	no
188/ (2f)	ω_0 *real*	yes	yes
188/ (2g)	κ_0 *real*	yes	yes
188/(2i)	Plot $G(x,1/2)$	no	yes
190	In each case take $M=40$.	yes	yes
194/line 1	Applying this result to Eq. (3.1.4),	no	no
199/Cell 3.2	**`A[n_] = FullSimplify[…`**	no	no
204/(3.1.29)	$\frac{1}{\rho(x)}\frac{\partial}{\partial x}\left(T(x)\frac{\partial}{\partial x}y_{eq}(x)\right)=-S(x)$	no	yes
208/(3.1.39)	$\frac{\partial \varepsilon}{\partial t}=\frac{\partial}{\partial x}\left(\kappa\frac{\partial T}{\partial x}\right)+S(x,t).$	no	no
210/(3.1.48)	$0=\frac{\partial}{\partial x}\left(\kappa(x)\frac{\partial T_{eq}}{\partial x}\right)+S(x)$	no	yes
224/(3)	$W(r)=-GM_e/r-\omega^2 r^2/2$	yes	yes
227/(6)(a)	~~from the fret to the post~~	yes	yes
227,228/(7)	$\frac{\partial^2}{\partial t^2}y(x,t)=\frac{\partial^2}{\partial x^2}y(x,t)+f(x)$ (a) … Take $f(x)=0$. (b) … Take $f(x)=x$.	no	no
229(11)	$y(x) = -(g/2T)(L_2 - x)(m + M/2+\rho x)$	yes	yes
229/(12)(b)	Recall that a ~~rigid~~ pendulum has frequency $\sqrt{\tau/I}$, where τ is the maximum possible torque due to gravity, and I is…	yes	yes
238/1st paragraph	$A_n=\frac{2V_0}{a\sinh(n\pi b/a)}\int_0^a \cos\frac{n\pi x}{a}dx$	no	yes
244/Cell 3.21	`Do[ r[θ_,ϕ_] =`	yes	no
248/(3.2.44)	$\partial^2 Z/\partial z^2=\kappa Z$	no	yes
248/after Eq. (3.2.48)	The general solution is in terms of two independent functions, called *Bessel functions* ~~*of the first kind*~~ $J_m(x)$, and $Y_m(x)$.	yes	yes
253/Cell 3.34	`A[n_] = 2 V0 / (a² BesselJ[1,j[n]]^2 Sinh[j[n] L/a])…` `2 V0 Csch[L j[n] / a] / (BesselJ[1,j[n]] j[n])`	yes	yes
257/(1d)	$\frac{\partial\phi}{\partial x}(0,y)=\phi(1,y)=\ldots$	no	yes
257/(4)	A grounded conducting cylinder of radius…	yes	yes

271/center of page	…the set of Bessel eigenfunctions…Sec. 3.2.5, satisfied the Sturm-Liouville…	yes	no
277/(17)	$k_n a \tan k_n a = mV_o a^2/\hbar^2 \ldots \qquad mV_o a^2/\hbar^2 = 1$	yes	yes
277/(22)	*better hint:* [Hint: Eq. (4.1.24) implies that the adjoint eigenmodes must satisfy different boundary conditions than those given above.]	yes	yes
281/(4.2.22)	$c_{pn}(t) = \int_0^t g(t-t_0)\frac{(\psi_n(x), \bar{S}(x,t_0))}{(\psi_n,\psi_n)}\, dt_0$	no	yes
282/Eq. (4.2.27)	$(\psi_n, v_o) \to (\psi_n, v_o - \frac{\partial u}{\partial t}(x,0))$	yes	no
285/before Cell 4.10	$c_n(t) = A_n e^{\lambda_n t} + \frac{2(-1)^n}{n\pi}\int_0^t e^{\lambda_n(t-\bar{t})}\cos\omega_o \bar{t}\, d\bar{t}$	yes	yes
288/(4.2.46)	$\psi_n(z) = AJ_0(j_{0,n}\sqrt{z/L})$	no	yes
292/Cell 4.18	`ψ[n_,z_] := BesselJ[0,j0[[n]]]`	yes	no
294/(3)(b)	Take $\chi = 2 \times 10^{-7}$ m^2/s, $C = 4 \times 10^6$ J/m^3K, and assume insulating…	no	no
297/(9)(b)	$J_1(2\omega_n\sqrt{a/\alpha g}) = 0$	no	no
298(10)	rewrite part (b) and (c): in (b) add an animation of the solution; (c) Find values of ω for which $z(r,t)$ increases without bound.	yes	yes
300/(19)	$K(t) = \frac{1}{2}\int_V d^3r\, \mathcal{m}\, \dot{\eta}^2(x,t)$	yes	yes
308/line 16	$(\psi_{mn}, \nabla^2 u)$	yes	no
346/Cell 4.49	add (10^6 years) to the axis label of the graph.	yes	no
346/center of page	…20 million years or so. This…	yes	no
347/(2c)	The initial conditions are $\dot{z} = 0$, $z(x,y,0) = t(x)t(y)$,	no	yes
348/(7)(b)	Garland, (1979, p. 356)	yes	yes
348/(9)(b)	$c = a = 1$	yes	yes
350/Eq. (4.4.37)	$0 \le l < n$,	yes	yes
352/(23)	$\partial_t z(r,0) = 0$,	yes	no
353/(26)	New initial condition: $\phi = 0 = \partial_t \phi$ initially.	yes	no
361-365	Change the normalization of $\psi(x,t)$ from $A = 1/\sqrt{2\,\mathrm{Pi}\,a^2}$ to $A = 1/\sqrt{\sqrt{\pi}\,a}$	yes	yes
371/Eq. above (5.1.51)	$p(\mathbf{r},t) = \mathrm{Re}\left(e^{i[\mathbf{k}_0\cdot\mathbf{r}-\omega(k_0)t]}\int\frac{d^3k}{(2\pi)^3}2C(\mathbf{k})e^{i(\mathbf{k}-\mathbf{k}_0)\cdot[\mathbf{r}-\mathbf{v}_g(\mathbf{k}_0)t]}\right)$	no	no
378/3rd line above (5.1.77)	$p_0(\mathbf{r}) = Pe^{-r^2/a^2}, v_0(\mathbf{r}) = 0$	no	yes
378/(5.1.77)	$p(\mathbf{r},t) =$ ~~2~~ $\mathrm{Re}\int\ldots$	no	yes
383/line 3	an~~y~~ entirely different direction	yes	no
389/(15)	A free particle of mass m is described initially…	no	yes
389/(15)	taking $\hbar = m = A = 1,\ \beta = 1/10, \ldots,$	yes	yes
396/(30)(a)	$T(x,t) = (T_0 - T_1)erf(x/2\sqrt{\chi t}) + T_1$	no	yes
409/line 5	when we analyzed the motion of	yes	no

421/Eq. (5.2.55) and following line	*α replaced by* $-\alpha$	yes	yes
422/Cell 5.28	*x-axis label*: `α^(1/3)(x-xo)`	yes	no
438/2nd par. 1st line	…the boundary shown in Fig. 6.1(b) is more difficult to treat…	yes	yes
442/Cell 6.15	`Integrate[v[i,j,x,y]/`	yes	no
453/line 7	…whereas the notation **`c[n,t]`** does not, …	no	no
462/line 2	… and the top end ~~and~~ of the tube …	no	no
463/(7)(a)	For basis functions, use $\sin n\pi\,\bar{x}$.	yes	no
478/Cell 6.72	*add* `Clear["Global`*"];`	yes	no
479/Cell 6.73	~~`Clear["Global`*"];`~~	yes	no
480/Cell 674	`... + Δt²c[j, k]²((z[j + 1, k, n − 1] − 2z[j, k, n − 1] + z[j − 1, k, n − 1])/Δx² + (z[j, k − 1, n − 1] − 2z[j, k, n − 1] + z[j, k − 1, n − 1])/Δy²) /; n ≥ 2`	no	yes
480/Eq. above Cell 6.75	$a_{jk} = \ldots + \dfrac{c_{jk}^2}{\Delta y^2}(z_{jk+1}^0 - 2z_{jk}^0 + z_{jk-1}^0)$	no	yes
504	*move the heading* **Exercises for Sec. 6.2**	yes	no
505/(4)	$\Delta t[\lvert V_o\rvert/\hbar + 2\hbar/(m\Delta x^2)] \le 1$ and $\Delta t\, V_o \ge \hbar$	yes	yes
506/(9)	$\dfrac{\partial T}{\partial t} = \dfrac{\partial^2 T}{\partial r^2} + \dfrac{1}{r}\dfrac{\partial T}{\partial r} + \dfrac{1}{r^2}\dfrac{\partial^2 T}{\partial \theta^2} + r^2 \cos m\theta$	yes	no
506/(9)(a)	One possibility is $r(j) = (j-1/2)\Delta r, \ldots$	yes	yes
512-566	*Chapter heading:* **Nonlinear Partial Differential Equations**	yes	no
514/2nd line from bottom	Substituting into Eq. (7.1.15) yields	no	yes
534/(3)(a)	… Eqs. (5.2.48), ~~(5.2.75)~~, show that the local wavenumber…	yes	no
552/Cell 7.50	Reproduction error in the figure, 2nd printing only.	no	no
562/(4)(b)	... form of solition solutions for which $f \to 0$ as $s \to 0$ and $f \to$ ~~2~~ π	yes	yes
562/(5)	... allowing ~~steady solutions~~ and solitons. ... *last line replaced:* Show that solitons of the form $\psi(x,t) = e^{i(kx-\omega t)} f(x-2kt)$ exist provided that $\omega < k^2$, and find the form of *f*.	yes	yes
564/(9)	For the initial conditions take $f(x,0) = 3\sin(\pi x/L)$ and $\dot{f}(x,0) = 0$.	no	yes
588/(9)(a)	... by a Poisson distribution.	yes	no
590/13(f)	$\langle s^2 \rangle$	yes	no
590/(13)(i)	Explain why this quantity is positive. ~~for short times, but vanishes at large times $t_n >> \gamma^{-1}$.~~	no	yes
590/(13)(j)	Solution: $\langle x_n^2 \rangle = 2D_V \Delta t^3 \dfrac{n(1-\alpha^2) - (1-\alpha^n)(1+2\alpha-\alpha^n)}{(1-\alpha)^3(1+\alpha)} + \langle x_n \rangle^2$	no	yes
593/Eq. (8.2.3)	$\langle f \rangle$	yes	no
599/Cell 8.12	`Show[h,t,DisplayFunction->$DisplayFunction];`	yes	no
610/(6)(d)	$\rho(x,n) = a(a\lvert x\rvert/2)^{n-1/2} K_{1/2-n}(a\lvert x\rvert)/\sqrt{\pi}(n-1)!$	yes	no

610/(7)(a)	… is a random step in velocity with zero mean, $\langle s \rangle = 0$. Solve… $\langle v_n v_{n+m} \rangle = v_0^2 \alpha^{2n+m} + \langle s^2 \rangle \alpha^m \frac{1-\alpha^{2n}}{1-\alpha^2}, \ m \geq 0$	no	yes
622	Caustics	yes	no
627	*new listing under Hermitian operators:* finite-differenced, 6.3 Exercise 3	yes	yes
631	*New listing:* Resonance, 82 106 Exact, 82, 110, 120, 122, 295, 296	no	yes

Last updated December 7, 2006. List available on the web at http://sdpha2.ucsd.edu/namethods/Corrections.pdf