Corrections to Third Edition of Pinsky "Partial Differential Equations and Boundary Value Problems with Applications", 1998. (9 August, 1999)

Page xiv, line 13: Appendices

Page 1, line 7: in the appendices

Page 4, Exercise 2: $u(x,y) = e^{kx}e^{k^2 y}$

Page 5, line 2: Newton's law of gravitational...

Page 5, line 22: $u(x_i;t)$

Page 7, line 21: is *sometimes* called...

Page 9, exercise 1: $u_x(L;t) = 0$

Page 9, exercise 2: $u_x(L;t) = \Phi$

Page 9, exercise 3: $u_x(L;t) = h(T_1 - u(L;t))$

Page 10, line 6: $x^2 + y^2 < R^2$

Page 10, line 13: $t > 0$, $0 < x < L$

Page 11, line 11: second item in display should read $\frac{Y''(y)}{Y(y)} = -\lambda$

Page 12, line 17: $(A_1 \sinh kx + \cdots \sin ky)$

Page 15, line 3: $\frac{d}{dx}(e^{\alpha x}) =$

Page 17, line 20: $y^2 Y'' + yY' = 0$

Page 17, line 23: $y^2 Y'' + yY' + l^2 Y = 0$

Page 18, line 5$-$: $0 = u(0;y) = A_1(\cdots$

Page 18, line 4$-$: that $A_1 = 0$ and $0 = u(L,y) = A_2 \cdots$

Page 18, line 1$-$: $A = A_2 A_3$ (instead of $A = A_1 A_3$)

Page 25, line 15: $\sum_{i=1}^{N} ||\varphi_i||^2 (c_i - \cdots$

Page 29, line 8: $(1/\sqrt{2\pi}, \sin x/\sqrt{\pi}, \cos x/\sqrt{\pi})$

Page 32, line 7−: ...we have $< \varphi, a\psi >= \bar{a} < \varphi, \psi >$ for any complex constant

Page 33, Exercise 3: Let $\bar{f}$

Page 33, Exercise 8: $g(x) = b_1\varphi_1(x) + \cdots$

Page 43, line 17: $f_E(x) = f(-x) \quad -L < x < 0$

Page 45, Exercise 10: $-\pi < x < \pi$

Page 46, line 1−: $x' = n\pi x/L$

Page 49, line 6: where $x \in (-\pi, \pi)$

Page 50, lines 2,4,6: $\int_{x_i}^{x_{i+1}}$ instead of $\int_{x_i}^{x_i+1}$ (five different places)

Page 51, line 5: $\cos a \sin b = \frac{1}{2}[\sin(a+b) - \sin(a-b)]$

Page 53, line 8−: Insert "$\lim_{N\to\infty}$ " before $\int_0^\pi D_N(u)\,du$

Page 56, Exercise 14(a): $f(u) = \ldots$

Page 56, Exercise 14(e): If $(N - \frac{1}{2})\pi \le X \le (N + \frac{1}{2})\pi$

Page 58, equation (1.3.1) : Insert $\cdots$ before $\cos(2n-1)x$

Page 59, last line:

$$\sum_{k=1}^{n} g(x'_k)\Delta x_k = \cdots$$

Page 60, line 2:

$$\frac{2n}{\pi}\frac{\pi}{n}\left[\sin(\pi/2n) + \frac{\sin(3\pi/2n)}{3} + \cdots\right.$$

Page 65, lines 17,18,19:

$$A'_0 = \frac{1}{2L}\int_{-L}^{L} \cdots$$

$$A'_n = \frac{1}{L}\int_{-L}^{L} \cdots = \frac{n}{L}\int_{-L}^{L} \cdots$$

$$B'_n = \frac{1}{L}\int_{-L}^{L} \cdots = -\frac{n}{L}\int_{-L}^{L} \cdots$$

Page 65, line 20: ....and used the continuity of $f(x), -L < x < L$

Page 66, line 13: $F(-\pi) = F(\pi)$

Page 67, line 3: $[\frac{\cos nu - \cos n\pi}{n}]$

Page 75, line 2: $(a_n^2 + \cdots$

Page 78, line 11: Change De Moivre's to Euler's

Page 79, line 8: Change De Moivre's to Euler's

Page 79, line 6$-$: e^{ax} instead of e^{axx}

Page 81, line 4$-$:$\alpha_0 = [F(L-0) - F(-L+0)]/2L$

Page 83, exercise 5: $\frac{r \sin x}{1+r^2-2r\cos x} = \sum_{n=1}^{\infty} r^n \sin nx$

Page 83, exercise 7: $\lim_{M,N\to\infty} \sum_{n=-M}^{N} \alpha_n e^{in\pi x/L}$

Page 83, exercise 7: Try example 1.1.4 at $x = 0$

Page 85, line 20: $0 = A\cos(L\sqrt{\lambda}) + \cdots$

Page 87, line 3 of Solution of Example 1.6.3: $= A(1 + hL)$

Page 87, lines 6-7 of Solution of Example 1.6.3: $0 = h(Ae^{\mu L} + Be^{-\mu L}) + \cdots$

Page 87, line 10 of Solution of Example 1.6.3: $B\sqrt{\lambda}$

Page 90, Last two lines:

$$\cos\alpha(A\sinh\mu a + \cdots + B\mu\sinh\mu a) = 0$$
$$\cos\beta(A\sinh\mu b + \cdots + \mu B\sinh\mu b) = 0$$

Page 92, line 16: This is in the interval $0 < L\sqrt{-\lambda} < \sqrt{|\cot\alpha\cot\beta|}$

Page 92, lines 18-19: The first one satisfies $0 < L\sqrt{-\lambda_1} < \sqrt{|\cot\alpha\cot\beta|}$ while the second one satisfies $L\sqrt{-\lambda_2} > \sqrt{|\cot\alpha\cot\beta|}$

Page 93, bulleted summary:

Second bullet should read: .....This satisfies $0 < L\sqrt{-\lambda_1} < \sqrt{|\cot\alpha\cot\beta|}$

Third bullet should read:..... The first one satisfies $0 < L\sqrt{-\lambda_1} < \sqrt{|\cot\alpha\cot\beta|}$ while the second one satsifies $L\sqrt{-\lambda_2} > \sqrt{|\cot\alpha\cot\beta|}$

Page 99, line 4−: grad$u$ (decrease space)

Page 100, line 11−: delete minus sign before "div"

Page 101, line 12: When $x_2 \to x_1$, the *integrand* tends to....

Page 101, line 13: ...resulting integral tends to $q_x^x(x_1, y_1, z_1)$

Page 103, line 4: $-hT_1$ (delete $/k$)

Page 103, line 5: $-kB$ (insert minus sign)

Page 105, line 22: $\sqrt{\pi K\tau}$

Page 108, Exercise 3, lines 2-3: $\ldots + h(u - T_0)](x, y, L) = 0$

Page 113, line 5−: $O(e^{-at})$ (change 0 to O)

Page 120, exercise 6, line 2: $u_z(L : t) = 0$

Page 123, line 6−: $U''(z) - \sum_{n=1}^{\infty}$ (change = to −)

Page 125, line 14−: $u_z(L; t) = 0$

Page 125, line 1−: $(4') : v(z; 0) = T_3 - T_1$

Page 126, line 10−: $B\sqrt{\lambda}\cos L\sqrt{\lambda}$

Page 127, example 2.3.2: ...where h, T_1, T_2 and T_3 are...

Page 127, line 1−: $U(z) = T_1 + hz(T_2 - T_1)/(1 + hL)$ (change t_2 to T_2

Page 130, line 3−: f_n, and $u_n(t)$ are obtained....

Page 131, line 4: $u_n(0) = f_n$

Page 131, line 6: $u_n(t) = f_n e^{-\lambda_n K t} + \cdots$

Page 131, line 10−: $\cos\alpha\sin\beta + \sin\alpha\cos\beta + \cos\alpha\cos\beta \neq 0$

Page 136, line 1: Should read

$$-T^{-}(a:t)\frac{(\partial\mathbf{r}/\partial s)(a;t)}{|\partial\mathbf{r}/\partial s)(a;t)|} = \cdots$$

(add minus sign and change b to a in three places

Page 154, line 14$-$: $\sum_{m,n=1}^{\infty}$ instead of single sum

Page 154, line 10$-$: $\sum_{m,n=1}^{\infty}$ instead of single sum

Page 157, line 11$-$: $\sum_{m,n=1}^{\infty}$ instead of single sum

Page 158. lines 13, 17, 19,22: $\sum_{m,n=1}^{\infty}$ instead of single sum

Page 160, line 8: $\sum_{m,n=1}^{\infty}$ instead of single sum

Page 163, line 16 of table: $2^3 \cdot 5$

Page 165, line 3$-$: $x = L_1$

Page 172, line 4$-$: $u_{\varphi\varphi}$ at end

Page 175, solution of example 3.1.3 :

$$-k\frac{\partial u}{\partial \rho}|_{\rho=\rho_2} = \frac{-k}{\rho_2}\frac{T_2 - T_1}{\ln(\rho_2/\rho_1)}$$

Page 178. line 15$-$: $R^{-n}B_n = \cdots$

Page 187, line 3: $\frac{a_0}{\rho\sqrt{\lambda}}\sum \ldots$

Page 189, line 4$-$: $e^{-i\theta}$ instead of $e^{i\theta}$

Page 189, line 3$-$: $= -\int_0^{\pi} \cdots$

Page 190, line 8: $= -\frac{x}{m}$

Page 191, line 13; This is a first-order linear equation for v', which may be solved.....

Page 196, lines 1-2: $\theta(\rho)$ is unbounded when $\rho \to \infty$.

Page 197, line@: $= +R(x)\ldots$ and $\cos\beta J_m(x) + x\sin x J'_m(x) = 0$

Page 198, line 5: Add $\lambda = x_n^2$ at end of line

Page 200, line 1: ...use the formulas (3.2.18)-(3.2.19)....

Page 201, line 7−: $\beta = 0$

Page 202, line 11: $\int_0^1 xJ_0(xx_n)^2\,dx$

Page 204, line 3: $\mathbf{jj[3.5, 4]}$

Page 204, line 5: $\mathbf{jj[3.8, 3.85]}$

Page 211, line 12−: initial conditions (3.3.2)-(3.3.3)

Page 213, line 9−: and $A_{0n} = 0$ for $n > 0$, while...

Page 218, line 8: $\beta = 0$

Page 219, line 12: $U(\rho_{max}) = T_1$

Page 221, line 14 [will check dimensions here and elsewhere]

Page 222, line 3: $-\pi \le \varphi \le \pi$

Page 223: lines 6,11,12, 14,15: Change Φ to R in each case

Page 223, line 16: chnage $R_2^2 - R_1^2$ to $\rho_2^2 - \rho_1^2$

Page 225, line 8: $\lambda = i\omega/K$

Page 228, line 20: delete $-m^2$

Page 232, line 14: $1 = \frac{8}{\pi}\ldots$

Page 238, line 1: $w_r = ru_r + u$

Page 241, line 10: $f(r) = T_2$

Page 244, line 8: $ka\mu/(k - ah)$

Page 244, line 5−: $rf(r) - W(r)$

Page 247, line 10−: change L to a in two places

Page 247, line 6−: $(2aC/n\pi)$

Page 247, line 4−: change L to a

Page 259, line 6: $[(1-a^2)P'_k(a)-(1-b^2)P'_k(b)]$

Page 280, line 11−: $e^{-ia\mu}F(\mu)$ is the Fourier....

Page 286, line 3−: ....satisfies $\int_0^\infty |F_s(\mu)|\,d\mu < \infty$

ANSWERS

Page 503, sec 0.2.3, exercise 1(d): $Y' + (\lambda - 1)Y = 0$

Page 504, Exercise 5: first line should read:

$$\lambda < 0 : u(x,y) = [A_1 \cos(\sqrt{-\lambda}\ln|x|) + A_2 \sin(\sqrt{-\lambda}\ln|x|)](A_3 e^{y\sqrt{\lambda}} + A_4 e^{-y\sqrt{-\lambda}})$$

Page 504, solution of Exercise no. 2 in section 0.2.4: should be $A_n \sin(\ldots)$ instead of $A_n \cos(\ldots)$

Page 504, Exercise 1(d) in section 0.3: answer to part (d) should be (7)

Page 505, Exercise 5 in section 1.1: should be $\frac{1}{2} - \frac{1}{2}\cos(4x)$

Page 505, Exercise 6 in section 1.1: should be $\frac{1}{2}\cos 3x + \frac{3}{4}\cos(4x)$

Page 505, line 19 (exercise 16(c)): change $L/n\pi$ into $n\pi/L$ in the denominator

Page 507, line −2: Change Φ_0 to Φ.

Page 511, Section 3.3, Exercise 1: $U(\rho) = (g/4c^2)(\rho^2 - a^2)$

Page 511, line 1−: exercise 5, last part is incorrect formula for A_n. Need $A_n = \frac{2}{acx_n J_1(x_n)^2}\int_0^R \cdots$

End of corrections, August 9, 1999