Partial Differential Equations,
An Introduction to Theory and Applications
by
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Corrections to Text

page 27, problem 3: This problem is too hard (but can be done with maple or mathematica). Calculate $u_2(x)$ only.

page 41: problem 7 should be the initial value problem posed on the plane $(x, y) \in \mathbb{R}^2$.
A better version of the problem is:
7b. Use the method of characteristics to solve the initial value problem for $u = u(x, y, t)$ on the domain $-\infty < x, y < \infty$, small $t > 0$:

$$\begin{aligned} u_t + y\,u_x + uu_y &= 0, \\ u(x, y, 0) &= x + y. \end{aligned}$$

Show that the solution has a singularity as $t \to t^*$ for some $t^* > 0$, and find the value of t^*.

Problem 10 should refer to a different example - example 5, chapter 2.

page 55, near top: $(x - t)$ should read $x - ct$. In the formula for $u(x, t)$, the lower limit of the integral should read $ct - x$.

page 62, problem 7: the formula for u should have an additional term:

$$u(x,t) = -\int_0^{t-x} h(y)\,dy + \frac{1}{2}(\phi(x+t) + \phi(t-x)) + \frac{1}{2}\int_{t-x}^{x+t} \psi(s)\,ds + \int_0^{t-x} \psi(s)\,ds.$$

page 79, problem 2: Include "in $\mathbb{R}^n$"

page 117, problem 7.5: a '+' should be '='. Prove

$$(f * g)' = f' * g = f * g'.$$

page 118, problem 6(b): There should be a π in the argument of sin : $\sin \pi(x - n)$.

page 137, Example 1. Integral of $\eta(\mathbf{x})$ should be over $\mathbf{x} \in \mathbb{R}^n$.

page 138: Delete sentence after Lemma 9.1.

page 147: Third line of text should read: "We now investigate the contributions from $\partial B(x, \epsilon)$ as $\epsilon \to 0$."

page 150, problem 1(c) should read: "Write the solution $u(x)$ satisfying $u(0) = 0$ in the form"

page 150, problem 9: Hint should be $u = v/r$.

page 173, problem 3: Missing minus sign on u''. $Lu(x) = -u'' + c(x)u$

page 219: line 5 from bottom: w should be ψ.

page 243: problem 5: Define $g(r) = rf(r)$. Then properties in parts (a), (b) can be stated cleanly in terms of derivatives of g. In particular, genuine nonlinearity depends on $g''(r) \neq 0$ rather than the condition $f''(r) > 0$ stated in the text.