

**ERRATA AS OF DECEMBER 2022 FOR CHOKSI: PARTIAL  
DIFFERENTIAL EQUATIONS: A FIRST COURSE**

All subsequent errata postings will consist of these and any new errors/typos found since Nov. 2022.

- (1) For Exercise 1.5 on Page 14. The Euler-Tricomi equation should read  $u_{xx} - xu_{yy} = 0$  (i.e. note the minus sign).

- (2) Page 46, second to last displayed equation the  $y$  should be in the denominator, i.e.,

$$x_0 = y^2 + \frac{x - y^2}{y(\log y + 1)}.$$

- (3) Page 78, Exercise 2.22b): second term in the PDE should be  $yu_y$  not  $yu_x$ .

- (4) Page 85, outlined box of Fig 3.1 (right) with the triangle: hypotenuse should read  $\sqrt{1 + u_x^2}$ .

- (5) Page 132, Footnote 7 should read:  
“Namely, the inequality  $\mathbf{a} \cdot \mathbf{b} \leq |\mathbf{a}||\mathbf{b}|$  for any  $\mathbf{a}, \mathbf{b} \in \mathbb{R}^3$ .”

- (6) Page 202 Exercise 5.25: One should write this expression **exactly** as Dirac did: So it should read

$$\left\langle \int \delta(a - x) dx \delta(x - b) \right\rangle = \delta(a - b).$$

- (7) Top of page 216: “Following the remark closing the last subsection” should be “Following footnote 5 on page 213”.

- (8) **(IMPORTANT CORRECTION)** On page 232, second displayed equation, there should be **no complex conjugate** for  $f(x)$ . That is, we interpret any complex-valued locally integrable function  $f(x)$  as a **tempered distribution** by

$$\langle F_f, \phi \rangle = \int_{-\infty}^{\infty} f(x) \phi(x) dx, \quad \text{for all } \phi \in \mathcal{S}(\mathbb{R}).$$

This **corrected** definition is, in fact, consistent with how we have interpreted complex-valued functions in the sense of tempered distributions in the subsequent material. It is also consistent with the motivation at the top of page 230 for definition of the Fourier transform of a distribution.

Note that this distributional pairing differs from the  $L^2$  inner product of two complex-valued functions  $f$  and  $\phi$  (as defined on page 455) wherein the complex conjugate does appear.

- (9) On page 262 in the table, the distributional Fourier transform of  $\delta_a$  should be  $e^{-iak}$ ; i.e., there is a missing minus sign.
- (10) On page 315, second line of Exercise 7.14: “Let  $\Delta > 0$  be some” should be “Let  $\delta > 0$  be some”.
- (11) On top of Page 354 in Exercise 8.26: the trivial inequality should be  $ab \leq a^2/2 + b^2/2$ .
- (12) On page 507: In Caption of Figure 12.1 the second equation should read  $y = -\tan \alpha$ . Two lines below this caption, “looking for points  $u$ ” should be “looking for points  $\alpha$ ”.  
Also the notational choice of  $\alpha = \sqrt{\lambda}$  was a poor choice given that  $\alpha$  was already used as the diffusion coefficient in the PDE (12.16). Instead,  $\beta = \sqrt{\lambda}$  would have been a better choice of notation.
- (13) On page 434, 6th line of the second paragraph: “about the plane” should read “above the plane”.