

Errata for Multigrid Tutorial, Second Edition, 2nd and Later Printings

- p. 2. In the third line above (1.5), (x_i, y_i) should be (x_i, y_j) .
- p. 5. In problem 4, $f(x)$ should be $f(x, y)$.
- p. 28. In problem 14c, the eigenvector is missing a j -th power on the cosine term. It should read $w_{k,j} = [\cos(\frac{k\pi}{n})]^j \sin(\frac{j k \pi}{n})$ as on p. 22.
- p. 29. To the end of the sentence in problem 16c, add the phrase “, unless $\mathbf{e}$ is already zero.”
- p. 45 Line four from the bottom should read for $j = \text{coarsest}-1$ to 0 step -1.
- p. 50. In the second sentence of the 1D example, delete the leading phrase so that it reads “We discretize...” Just before (4.2) in the next sentence, add the phrase “for approximating the exact discrete solution, u_j .” In the next sentence, add “algebraic” before “error” and replace $u(x_j)$ by u_j .
- p. 52. The second equation is missing an $O(h^4)$ term. It should read $G(\theta) = G_0(\theta) - \frac{c_0 \omega h^2}{2} \cos(\theta) + O(h^4)$.
- p. 52. In the second sentence of the 2D example, add “algebraic” before “error”.
- p. 54. In the caption of figure 4.5 and in the fourth line from the bottom of the page, the region should read $[-\pi, \pi] \times [-\pi, \pi]$.
- p. 69. In problem 6(b), replace $u(x_j)$ by u_j .
- p. 71. Add the following sentence to the end of problem 13a: “A good choice for the weight here is $\omega = 2/3$.”
- p. 72. Add the following sentence to the end of problem 15a: “A good choice for the weight here is $\omega = 4/5$.”
- p. 91. Add the following sentence to the end of problem 2: “Assume that the constant from the Galerkin property is $c = 1$.”
- p. 91. Add the following sentence to problem 3, just before part (a): “Note that the left side of the discretized equations are divided by h^2 ; compare with (2.1). The eigenvalues of A^h need to be divided by h^2 as well.”
- p. 92. Change the last sentence in 3c to “Use the eigenvalues of A^h and the definition of matrix norms to show that $\|(A^h)^{-1}\|_h$ is bounded independently of h .”
- p. 99. Some subscripts are wrong in the last line. It should read

$$v_j^{2h} = I_h^{2h} v_{2j-1}^h = v_{2j-1}^h, \quad v_{j+1}^{2h} = I_h^{2h} v_{2j+1}^h = v_{2j+1}^h.$$

- p. 102. In the second sentence of the caption of table 6.2, FAC should read FAS.
- p. 104. Both occurrences of N on the right-hand side of the first equation should be in lower case.
- p. 104. The second equation is missing a $1+$. It should read $(J_j)_{i,i} = \frac{4}{h^2} + \gamma(1 + u_{i,j})e^{u_{i,j}}$.
- p. 110. In problem 6, “(a)-(e)” in the first line should read “(a)-(d)” and a negative sign should precede each $u''(x)$ in parts (i) and (ii) to avoid indefinite linear systems.
- p. 135. The middle expression in the equation in problem 11a is missing the weight term. It should read

$$P_J = (1 - \omega)I + \omega \mathcal{D}^{-1}(U + L) = I - \omega \mathcal{D}^{-1}A^h.$$

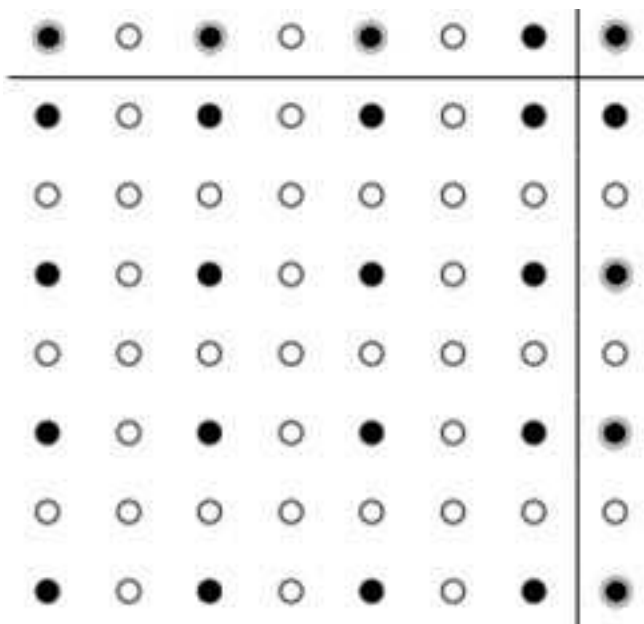


Figure 1: *Replacement for Figure 8.6 on page 151.*

- p. 145. The u in the first equation should be an e . Same for the second equation.
- p. 151. Figure 8.6 should be replaced by Figure 1 above.
- p. 155. In the 13th line from the bottom, replace “...12 V-cycles...” by “...9 or 10 V-cycles...”
- p. 159. In the heading of problem 2, $\mathbf{r}$ and $\mathbf{e}$ should be bold face: $\|\mathbf{r}\|_{D^{-1}} \ll \|\mathbf{e}\|_A$.