Chapter 5

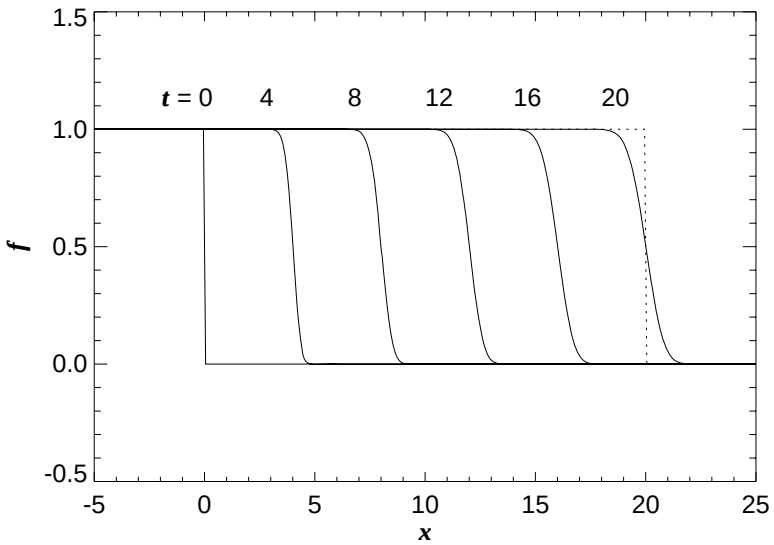
Errata

p. 10

wrong Figure 1.7 by the backward difference for $t = 0.4$, 0.8, 1.2, 1.6, and 2.0.

correct Figure 1.7 by the backward difference for $t = 4$, 8, 12, 16, and 20.

Figure 1.7 on p. 11 should be replaced by



p. 13

wrong It is not a coincidence that the condition for stability

correct It is not a cgabce coincidence that the condition for stability

Equation (1.45) should read

$$F^*_{j+1/2,n} = \frac{1}{2}\left(\frac{{f_{j+1,n}}^2}{2} + \frac{{f_{j,n}}^2}{2}\right) - \frac{1}{2}\frac{|f_{j+1,n} + f_{j,n}|}{2}\left(f_{j+1,n} - f_{j,n}\right). \tag{1.45}$$

Equation (1.124) should read

$$f_{j+1,n+1} - f_{j,n+1} = \sum_k B_k \left(f_{j+1+k,n} - f_{j+k,n}\right). \tag{1.124}$$

Equation (1.130) should read

$$f_{j,n+1} \;=\; f_{j,n} \;+\; \sum_{m=1}^{\infty} \frac{\partial^m f}{\partial x^m} \frac{(-\,c\Delta t)^m}{m!}\,, \tag{1.130}$$

Equation (1.132) should read

$$f_{j+k,n} \;=\; f_{j,n} \;+\; \sum_{m=1}^{\infty} \frac{\partial^m f}{\partial x^m} \frac{(k\Delta x)^m}{m!}\,. \tag{1.132}$$

p. 35, the third line from the bottom.

wrong The central difference satisfies Equation (1.134) for $m \leq 2$,

wrong The central difference satisfies Equation (1.134) for $m \leq 1$,

Equation (1.150) should read

$$F^*_{j+1/2} \;=\; \frac{c}{2}\left(f^{*(\mathrm{R})}_{j+1/2} \;+\; f^{*(\mathrm{L})}_{j+1/2}\right) \;-\; \frac{|c|}{2}\left(f^{*(\mathrm{R})}_{j+1/2} \;-\; f^{*(\mathrm{L})}_{j+1/2}\right). \tag{1.150}$$

Equations (1.156) and (1.157) should read

$$\begin{aligned} F^*_{j+1/2,n} \;&=\; \frac{1}{2}\left[\frac{\left(f^{*(\mathrm{R})}_{j+1/2,n}\right)^2}{2} \;+\; \frac{\left(f^{*(\mathrm{L})}_{j+1/2,n}\right)^2}{2}\right] \\ &\quad -\frac{|\lambda|}{2}\left(f^{*(\mathrm{R})}_{j+1/2,n} \;-\; f^{*(\mathrm{L})}_{j+1/2,n}\right), \end{aligned} \tag{1.156}$$

$$|\lambda| \;=\; \begin{cases} \dfrac{|f^{*(\mathrm{L})}_{j+1/2,n} \;+\; f^{*(\mathrm{R})}_{j+1/2,n}|}{2} & \left(\dfrac{|f^{*(\mathrm{L})}_{j+1/2,n} \;+\; f^{*(\mathrm{R})}_{j+1/2,n}|}{2} \;\geq\; \varepsilon\right) \\ \varepsilon & (\text{otherwise}) \end{cases}, \tag{1.157}$$

Equations (1.165) and (1.166) should read

$$\begin{aligned} F^*_{j+1/2,n+1/2} \;&=\; \frac{1}{2}\left[\frac{\left(f^{*(\mathrm{R})}_{j+1/2,n+1/2}\right)^2}{2} \;+\; \frac{\left(f^{*(\mathrm{L})}_{j+1/2,n+1/2}\right)^2}{2}\right] \\ &\quad -\frac{|\lambda|}{2}\left(f^{*(\mathrm{R})}_{j+1/2,n+1/2} \;-\; f^{*(\mathrm{L})}_{j+1/2,n+1/2}\right), \end{aligned} \tag{1.165}$$

$$|\lambda| \;=\; \begin{cases} \dfrac{|f^{*(\mathrm{L})}_{j+1/2,n+1/2} \;+\; f^{*(\mathrm{R})}_{j+1/2,n+1/2}|}{2} & \left(\dfrac{|f^{*(\mathrm{L})}_{j+1/2,n+1/2} \;+\; f^{*(\mathrm{R})}_{j+1/2,n+1/2}|}{2} \;\geq\; \varepsilon\right) \\ \varepsilon & (\text{otherwise}) \end{cases}, \tag{1.166}$$

Equation (1.168) should read

$$f_{j,n+1} \;=\; f_{j,n} - \frac{\Delta t}{\Delta x}\left(F^*_{j+1/2,n+1/2} \;-\; F^*_{j-1/2,n+1/2}\,.\right) \tag{1.168}$$

(2006, March 17)