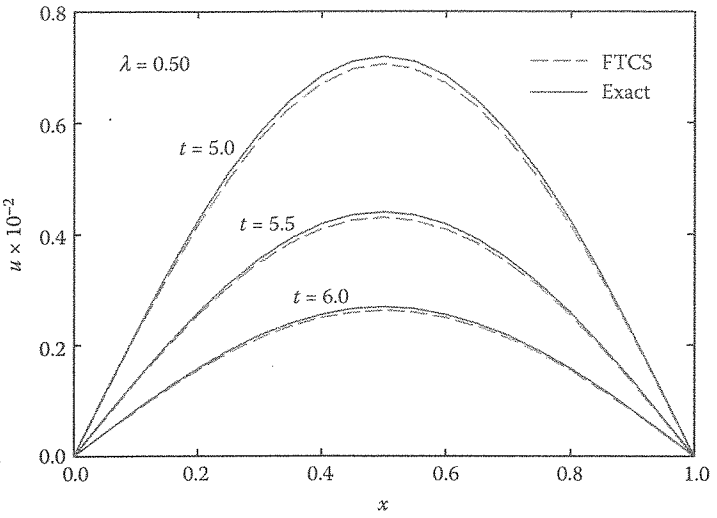

FIGURE 13.8 Numerical solutions for the diffusion problem (13.51)–(13.53) by the explicit FTCS method with the spatial step size $h_x = 0.05$ and the time step size $h_t = 0.00125$.

and with the initial solution profile

$$u(x, 0) = \sin(\pi x/L), \quad x \in [0, L]. \tag{13.53}$$

The exact solution satisfying this problem can be readily verified to be

$$u(x, t) = \exp(-\pi^2 Dt/L^2) \sin(\pi x/L). \tag{13.54}$$

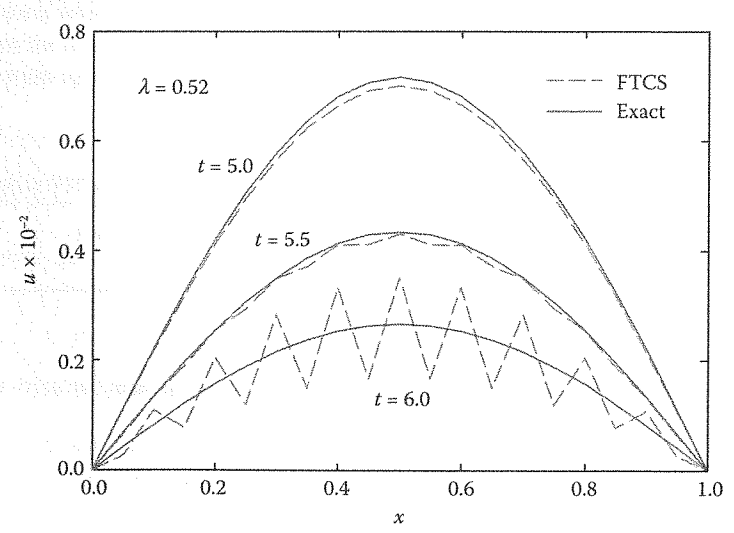

FIGURE 13.9 Numerical solutions for the diffusion problem (13.51)–(13.53) by the explicit FTCS method with the spatial step size $h_x = 0.05$ and the time step size $h_t = 0.0013$.