3.2 Solve the equation $\Phi_t = \Phi_{xx}$, $0 \leq x \leq 1$, subject to initial and boundary conditions

$$\Phi(x, 0) = \sin \pi x, \quad 0 \leq x \leq 1 ,$$
$$\Phi(0, t) = 0 = \Phi(1, t) \quad t > 0$$

Obtain the solution by hand calculation and use $\Delta x = 0.25$ and $r = 0.5$.

3.3 Derive the Crank-Nicholson implicit algorithm for the hyperbolic equation $\Phi_{xx} = a^2 \Phi_{yy}$, $a^2 =$ constant. Let $\Delta x = \Delta y = \Delta$.

3.4 Given a boundary-value problem defined by

$$\frac{d^2\Phi}{dx^2} = x + 1, \quad 0 < x < 1$$

subject to $\Phi(0) = 0$ and $\Phi(1) = 1$, use the finite difference method to find $\Phi(0.5)$. You may take $\Delta = 0.25$ and perform 5 iterations. Compare your result with the exact solution.

خلاصه درس تا آخرین جلسه در دو برگ A4

خلاصه بخشهای ۳.۵، ۳.۵.۱ و ۳.۵.۲ کتاب sadiku