$$\theta_i^{j+1} = \theta_i^j + 2\frac{\nu k}{h^2}\left(\theta_{i+1}^j - \theta_i^j\right) =$$

$$= \theta_i^j + \frac{2\nu k}{h}\left(\frac{\theta_{i+1}^j - \theta_i^j}{h}\right) =$$

$$\underline{\frac{\theta_i^{j+1} - \theta_i^j}{k} = \frac{2\nu}{h}\left(\frac{\theta_{i+1}^j - \theta_i^j}{h}\right)}$$

$$\theta_i^{j+1} = \theta_i^j + \frac{\nu k}{h^2}\left(u_{i+1}^j - 2u_i^j + u_{i-1}^j\right)$$

$$r = \frac{\nu k}{h^2}$$

$$\theta_{t,0} = \frac{2\nu}{h}\theta_{x,0} \Rightarrow 0 \quad \theta_{x,0} = 0$$

$$\theta_t = 0$$

$$\theta(x,0) = e^{-\frac{1}{2\pi\nu}(1-\cos(\pi x))}$$

$$x = 0 \quad e^0 = 1$$

$$x = 1 \quad e^{-\frac{1}{2\pi\nu}\cdot 2} = e^{-\frac{1}{\pi\nu}} \quad \nu =$$

$$\theta_x = -\frac{1}{2\pi\nu}\left(+\sin(\pi x)\cdot\pi\right) e^{-\frac{1}{2\pi\nu}(1-\cos\pi x)}$$

$$\theta_{x,0} = 0$$

$$\theta_{x,N} = 0$$

$$\boxed{f(x)} = u(x,0) = -2\nu\frac{\theta_x}{\theta}$$

$$\int f(x)\,dx = -2\nu\int\frac{\theta_x}{\theta}\,dx = -2\nu\ln\theta$$

$$\underline{\ln\theta = -\frac{1}{2\nu}\int f(x)\,dx + C}$$

$$\theta = C_1\, e^{-\frac{1}{2\nu}\int f(x)\,dx}$$

$$u_t = \beta u_{xx} - u u_x$$

$$\frac{u_i^j - u_i^{j-1}}{k} = \beta \frac{u_{i+1}^j - 2u_i^j + u_{i-1}^j}{h^2} - \frac{\left(u_{i+1}^{j-1}\right)^2 - \left(u_{i-1}^{j-1}\right)^2}{4h}$$

$$-\frac{\beta k}{h^2} u_{i-1}^j + \left(1 + \frac{2\beta k}{h^2}\right) u_i^j - \frac{\beta k}{h^2} u_{i+1}^j = \underbrace{u_i^{j-1} - k\frac{\left(u_{i+1}^{j-1}\right)^2 - \left(u_{i-1}^{j-1}\right)^2}{4h}}_{d_i}$$

u_i^0

$j = 1$

S. 172

S. 574