Varmelikningen i 2-dim.

$$u_t = -(u_{xx} + u_{yy}) \qquad \gamma = \frac{k}{h^2}$$

Ser på hver enkelt del $\qquad \sigma = \frac{k}{d^2}$

$$u_t = \frac{u(t+k) - u(t)}{k} = \frac{u_t - u_{t-1}}{k}$$

$$u_{xx} = \frac{u(x+h) - u(x)}{h} \qquad u_{xx} = \frac{\frac{u(x+2h) - u(x+h)}{h} - \frac{u(x+h) - u(x)}{h}}{h}$$

$$u_{xx} = \frac{u(x+2h) - 2u(x+h) - u(x)}{h^2}$$

$$u_{xx} = \frac{u_{x+1} - 2u_x - u_{x-1}}{h^2} \qquad u_{yy} = \frac{u_{y+1} - 2u_y - u_{y-1}}{d^2}$$

$$\frac{u_t - u_{t-1}}{k} = \frac{u_{x+1} - 2u_x - u_{x-1}}{h^2} + \frac{u_{y+1} - 2u_y - u_{y-1}}{d^2}$$

Samlet:

$$\frac{u_{txy} - u_{t-1\,xy}}{k} = \frac{u_{t\,x+1\,y} - 2u_{txy} - u_{t\,x-1\,y}}{h^2} + \frac{u_{tx\,y+1} - 2u_{txy} - u_{tx\,y-1}}{d^2}$$

$$u_{t+1\,xy} = (u_{t\,x+1\,y} - 2u_{txy} - u_{t\,x-1\,y}) \cdot \frac{k}{h^2} + (u_{tx\,y+1} - 2u_{txy} - u_{tx\,y-1}) \frac{k}{d^2} + u_t$$

Parallelliserer:

$$B = [1 - 2\gamma$$