B.V.P vs. i.v.p.

$$\left.\begin{array}{l} \dfrac{d^2T}{dx^2} - mT = 0 \\ x=0 \quad T(0)=20 \\ \qquad T'(0)=0 \end{array}\right\} \text{i.v.p}$$

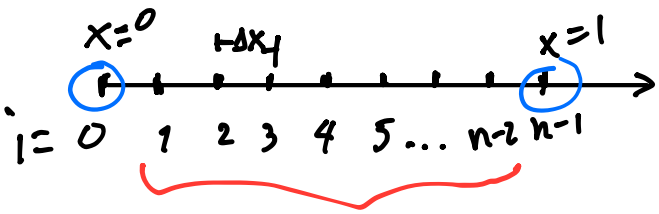
Euler, RK, ...

$$\left.\begin{array}{l} \dfrac{d^2T}{dx^2} - mT = 0 \\ x=0 \quad T(0)=20 \\ x=L \quad T(L)=100 \end{array}\right\} \text{B.V.P.}$$

Diferencias finitas.

$$\frac{d^2T}{dx^2} - mT = 0$$

$$\begin{cases} x=0 & T(0)=20 \\ x=1 & T(1)=100 \end{cases}$$




$$\frac{d^2T}{dx^2} \approx \frac{T_{i+1} - 2T_i + T_{i-1}}{\Delta x^2}$$

$$\frac{T_{i+1} - 2T_i + T_{i-1}}{\Delta x^2} - mT_i = 0 \qquad i = 1, 2 \cdots, n-2 \qquad n-2 \text{ Eqs}$$

$$T_i = 20 \qquad i = 0$$

$$T_i = 100 \qquad i = n-1$$

$$T_0 = 20 \qquad i = 0$$

$$\frac{T_2 - 2T_1 + T_0}{\Delta x^2} - mT_1 = 0 \qquad i = 1$$

$$\frac{T_3 - 2T_2 + T_1}{\Delta x^2} - mT_2 = 0 \qquad i = 2$$

$$\vdots$$

$$T_i = 100 \qquad 0 \qquad i = n-1$$

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & \cdots & 0 \\ \frac{1}{\Delta x^2} & -\frac{2}{\Delta x^2} - m & \frac{1}{\Delta x^2} & 0 & 0 & \cdots & 0 \\ 0 & \frac{1}{\Delta x^2} & -\frac{2}{\Delta x^2} - m & \frac{1}{\Delta x^2} & 0 & \cdots & 0 \\ & \ddots & \ddots & \ddots & & & \\ 0 & 0 & \cdots & & & & 1 \end{bmatrix} \begin{bmatrix} T_0 \\ T_1 \\ \vdots \\ \\ \\ \\ T_{n-1} \end{bmatrix} = \begin{bmatrix} 20 \\ 0 \\ \\ 0 \\ \vdots \\ 0 \\ 100 \end{bmatrix}$$