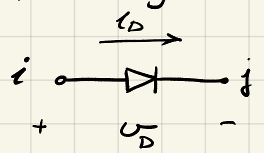
Diode model for assignment #2



$$v_D = v_i - v_j$$

$$i_D = I_s\left(e^{v_D/v_t} - 1\right)$$

stamp:

$$\underbrace{\begin{array}{l}\text{row } i \\ \\ \text{row } j\end{array}\begin{bmatrix} I_s\left(e^{(v_i - v_j)/v_t} - 1\right) \\ \\ -I_s\left(e^{(v_i - v_j)/v_t} - 1\right) \end{bmatrix}}_{f(x)}$$

Contribution to jacobian $\frac{\partial f}{\partial x}$

$\frac{\partial i_D}{\partial v_i}$ $\quad \frac{\partial i_D}{\partial v_j}$

$$\underbrace{\begin{array}{c|cc} & \text{Col } i & \text{Col } j \\ \hline \text{row } i & \frac{I_s}{v_t} e^{(v_i - v_j)/v_t} & -\frac{I_s}{v_t} e^{(v_i - v_j)/v_t} \\ \text{row } j & -\frac{I_s}{v_t} e^{(v_i - v_j)/v_t} & \frac{I_s}{v_t} e^{(v_i - v_j)/v_t} \end{array}}_{\text{Jacobian } \frac{\partial f}{\partial x}}$$

$-\frac{\partial i_D}{\partial v_i}$

$-\frac{\partial i_D}{\partial v_j}$