



$$\frac{d}{dt} I_{syn} = -I_{syn} + \alpha I_W$$

$$I_W = I_0 e^{k V_w}$$

$$I_{CD} = C_D \frac{d}{dt} V_w$$

$$I_{CD} = I_a - I_D$$

$$\Rightarrow C_D \frac{d}{dt} V_w = I_{CD}$$

$$I_a = I_0 e^{\frac{k(V_a - V_w)}{V_r}} \cdot \left(1 - e^{-\frac{V_w - V_a}{V_r}}\right)$$