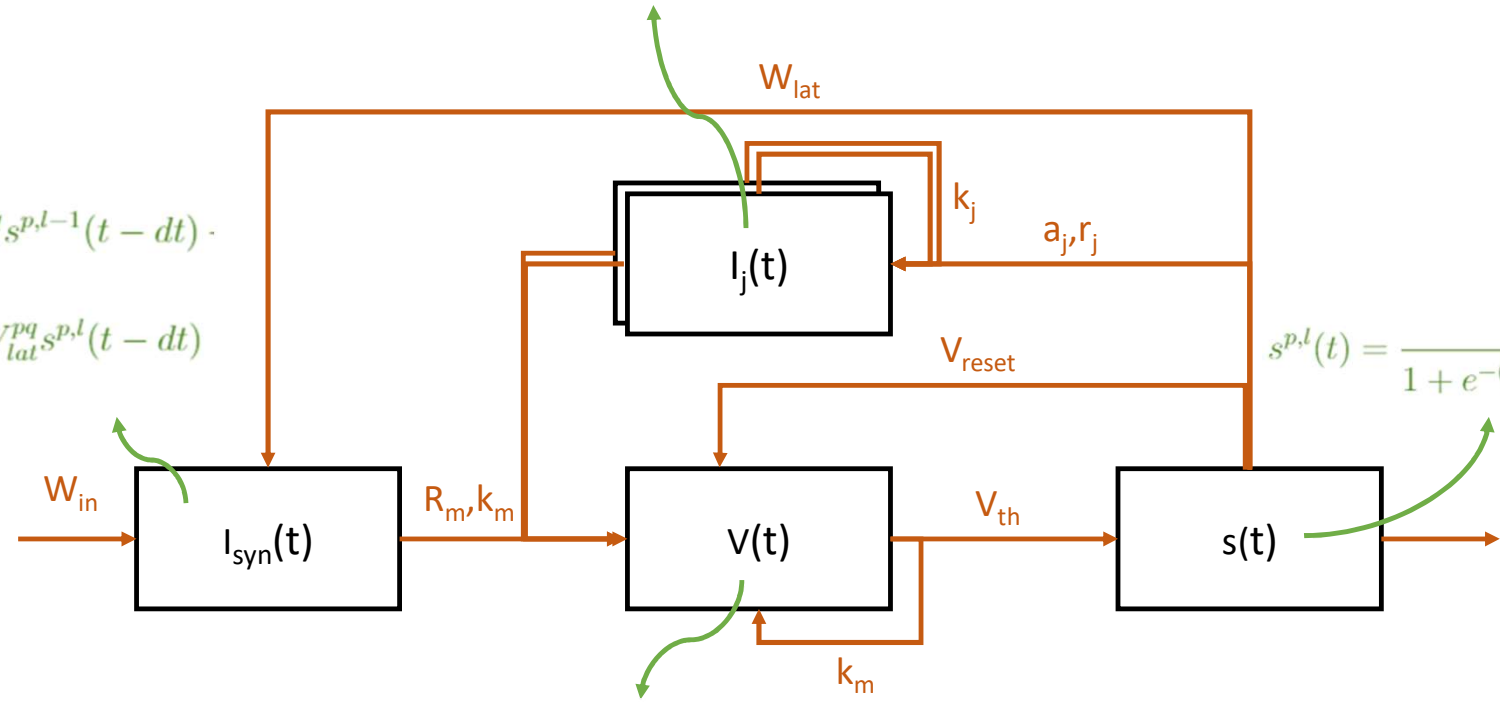
$$I_j^{p,l}(t) = I_j^{p,l}(t-dt)(1-k_j^{p,l}dt) + (a_j^{p,l} + r_j^{p,l} I_j^{p,l}(t-dt))\frac{1}{\tau} s^{p,l}(t-dt)dt$$

$$I_{syn}^{q}(t) = \sum_p W_{in}^{pq} s^{p,l-1}(t-dt) \cdot$$

$$+ \sum_p W_{lat}^{pq} s^{p,l}(t-dt)$$



$$s^{p,l}(t) = \frac{1}{1 + e^{-(V^{p,l}(t) - V_{th}^{p,l})/\sigma_V}}$$

$$V^{p,l}(t) = V^{p,l}(t-dt)(1-k_m^{p,l}dt) + R_m^{p,l}k_m^{p,l}\left(I_0^{p,l} + I_{syn}^{p,l}(t) + \sum_j I_j^{p,l}(t)\right)dt - \frac{1}{\tau}s^{p,l}(t)dt(V^{p,l}(t-dt) - V_{reset})$$