

$$\begin{aligned}\dot{x}_i &= \frac{-x_i + u_i + \sum_{j=1}^J w_{ij} \, b_j r_j}{\tau_d} \\ r_i &= \phi\left(x_i - a_{0_i} - c \sum_{k=1}^K a_{ik}\right) \\ \dot{a}_{ik} &= \frac{-a_{ik} + r_i}{\tau_k} \\ \dot{b}_i &= \frac{1 - b_i}{\tau_{rec}} - \frac{b_i \, r_i}{\tau_{rel}}\end{aligned}$$