1 Current

$$I_{NA} = -g_{NA} * m(t)^3 * h(t) * (u - E_{NA})$$

$$I_K = g_K * n(t)^4 * (u - E_K)$$

$$I_{Leak} = g_L * (u - E_L)$$

$$I_{x/xx} = g_{x/xx} * (u - E_{x/xx})^2$$

2 Model

2.1 HH

$$C * \frac{du}{dt} = I_{NA} - I_K - I_{Leak} + I(t)$$

$$C*\frac{du}{dt} = -g_{NA}*m(t)^3*h(t)*(u-E_{NA})-g_K*n(t)^4*(u-E_K)-g_L*(u-E_L)+I(t)$$

2.2 HHx/xx

$$C * \frac{du}{dt} = I_{NA} - I_K - I_{Leak} + I_{x/xx} + I(t)$$

$$C*\frac{du}{dt} = -g_{NA}*m(t)^3*h(t)*(u-E_{NA})-g_K*n(t)^4*(u-E_K)-g_L*(u-E_L)+g_{x/xx}*(u-E_{x/xx})^2+I(t)$$

3 I(t)

$$I(t) = \begin{cases} N * I & \text{when } t_{start} < t < t_{end} \\ 0 & \text{otherwise} \end{cases}$$

where I is the amplitude of the stimulation and N the number of synapse.