Celegans model units

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1 Model Equation

$$C\frac{dV}{dt} = \frac{-(G_c(V - E_c) + G_g(V - V_j) + G_s s_j(V - E_j)) + I_{ext}}{\tau} \tag{1}$$

2 Parameter Units

$$C(Capacitance) : nF = \frac{nC}{V} = \frac{nA * s}{V} \tag{2}$$

$$G(Conductance) : nS = \frac{nA}{V} \tag{3}$$

$$V(MembranePotential) : mV \tag{4}$$

$$\tau(timeunit) : 1s \tag{5}$$

3 Calculating unit of dV

$$dV : G * V * \left(\frac{1}{C}\right) \rightarrow \tag{6}$$

$$dV : \left(\frac{nA}{V}\right) * mV * \frac{V}{nA * s} \rightarrow \tag{7}$$

$$dV : pA * \left(\frac{V}{nA * s}\right) \rightarrow \tag{8}$$

$$dV : \frac{mV}{s} \tag{9}$$

4 Calculating unit of I_{ext}

$$I_{ext} : G * V \rightarrow \tag{10}$$

$$I_{ext} : \left(\frac{nA}{V}\right) * mV \rightarrow \tag{11}$$

$$I_{ext} : pA \tag{12}$$

5 Conversion to Fluorescent

$$F = F_{conv}(s) \tag{13}$$

$$\frac{\Delta F}{F_0} = \frac{F - F_0}{F_0} = \frac{s - s_0}{s_0} \tag{14}$$

$$F_0 = \text{resting synaptic activity} \tag{15}$$