

1 “environment” component

This component has no equations.

2 “membrane” component

membrane_voltage_diff_eq

$$\frac{d(V)}{d(time)} = \frac{-((i_{Na} + i_K + i_{Leak} + i_{app}))}{Cm}$$

3 “sodium_current” component

i_Na_calculation

$$i_{Na} = 120.0 * (x_{infinity})^{3.0} * (1.0 - n) * (V - 120.0)$$

4 “potassium_current” component

i_K_calculation

$$i_K = 36.0 * (n)^{4.0} * (V + 77.0)$$

5 “potassium_current_n_gate” component

n_diff_eq

$$\frac{d(n)}{d(time)} = (\alpha_n * (1.0 - n) - \beta_n * n)$$

alpha_n_calculation

$$\alpha_n = \frac{0.02 * (V + 55.0)}{\left(1.0 - e^{-\frac{(V+55.0)}{10.0}}\right)}$$

beta_n_calculation

$$beta_n = 0.25 * e^{\frac{-((V+65.0))}{80.0}}$$

6 “leak_current” component

i_leak_calculation

$$i_{leak} = 0.3 * (V + 54.0)$$

7 “transmitter_release” component

R_diff_eq

$$\frac{d(R)}{d(time)} = (kr_{plus} * Ca * (1.0 - R) - kr_{minus} * R)$$

8 “calcium_concentration” component

Ca_open_calculation

$$Ca_{open} = \frac{sigma}{2.0 * Dc * r * \pi}$$

sigma_calculation

$$sigma = -5.182 * i_V$$

i_V_calculation

$$i_V = g_{Ca} * P * \frac{2.0 * F * V}{R * T} * \frac{Ca_{ex}}{\left(1.0 - e^{\frac{2.0 * F * V}{R * T}}\right)}$$

9 “C1” component

$$\frac{d(C1)}{d(time)} = (delta_{C1_rxn0} + delta_{C1_rxn6})$$

10 “C2” component

$$\frac{d(C2)}{d(time)} = (delta_{C2_rxn0} + delta_{C2_rxn1} + delta_{C2_rxn7})$$

11 “C3” component

$$\frac{d(C3)}{d(time)} = (\delta_{C3_rxn1} + \delta_{C3_rxn2} + \delta_{C3_rxn8})$$

12 “C4” component

$$\frac{d(C4)}{d(time)} = (\delta_{C4_rxn2} + \delta_{C4_rxn3})$$

13 “O” component

$$\frac{d(O)}{d(time)} = \delta_{O_rxn3}$$

14 “C_G1” component

$$\frac{d(C_G1)}{d(time)} = (\delta_{C_G1_rxn6} + \delta_{C_G1_rxn4})$$

15 “C_G2” component

$$\frac{d(C_G2)}{d(time)} = (\delta_{C_G2_rxn4} + \delta_{C_G2_rxn7} + \delta_{C_G2_rxn5})$$

16 “C_G3” component

$$\frac{d(C_G3)}{d(time)} = (\delta_{C_G3_rxn5} + \delta_{C_G3_rxn8})$$

17 “rate_constants” component

rate_constants_alpha_calculation

$$\alpha = 0.45 * e^{\frac{V}{22.0}}$$

alpha_calculation

$$\alpha_ = \frac{\alpha}{8.0}$$

beta_calculation

$$\beta = 0.015 * e^{\frac{-V}{14.0}}$$

alpha__calculation

$$\beta_ = \beta * 8.0$$

da_dt

$$\frac{d(a)}{d(time)} = (ka_plus * T * (1.0 - a) - ka_minus * a)$$

kG_plus_calculation

$$kG_plus = \frac{3.0 * a}{(680.0 + 320.0 * a)}$$

18 “reaction0” component

This component has no equations.

19 “reaction1” component

This component has no equations.

20 “reaction2” component

This component has no equations.

21 “reaction3” component

This component has no equations.

22 “reaction4” component

This component has no equations.

23 “reaction5” component

This component has no equations.

24 “reaction6” component

This component has no equations.

25 “reaction7” component

This component has no equations.

26 “reaction8” component

This component has no equations.