albrecht_colegrove_friel_2002_version01

1 "environment" component

This component has no equations.

2 "cytoplasmic_calcium" component

Ca_i_diff_eq

$$\frac{\mathrm{d}(Ca\_i)}{\mathrm{d}(time)} = -(J\_i)$$

J_i_calculation

$$J\_i = (J\_pm + J\_ER)$$

3 "intraluminal_calcium" component

Ca_ER_diff_eq

$$\frac{\mathrm{d}(Ca\_ER)}{\mathrm{d}(time)} = J\_ER * \frac{v\_i * k\_i}{v\_ER * k\_ER}$$

Ca_ER_init_calculation

$$Ca\_ER\_init = \left(Ca\_i + \frac{J\_SERCA * Ca\_i}{P\_ER * \frac{Ca\_i}{v\_i}} \right)$$

4 "total_cytoplasmic_Ca_flux" component

J_ICa_calculation

$$J\_ICa = \frac{I\_Ca}{2.0 * F * v\_i * k\_i}$$

5 "Ca_extrusion_across_the_plasma_membrane" component

J_pm_calculation

$$J\_pm = (J\_extru + J\_ICa)$$

J_extru_calculation

$$J\_extru = (k\_i)^{-1.0} * \left(k\_leak\_pm * (Ca\_i - Ca\_o) + \frac{Vmax\_extru}{\left(1.0 + \left(\frac{EC50\_extru}{Ca\_i}\right)^{n\_extru}\right)} \right)$$

6 "Ca_uptake_by_SR_Ca_ATPase" component

J_SERCA_calculation

$$J\_SERCA = \frac{Vmax\_SERCA}{k\_i * \left(1.0 + \left(\frac{EC50\_SERCA}{Ca\_i}\right)^{n\_SERCA}\right)}$$

7 "ER_Ca_release" component

J_release_calculation

$$J\_release = \frac{P\_ER * (Ca\_i - Ca\_ER)}{v\_i * k\_i}$$

J_ER_calculation

$$J\_ER = (J\_SERCA + J\_release)$$

P_ER_v_i_calculation

$$P\_ER = v\_i * \left(P\_basal + \frac{Pmax\_RyR}{\left(1.0 + \left(\frac{EC50\_RyR}{Ca\_i}\right)^{n\_RyR}\right)} \right)$$