$$\frac{\partial V_{\mathrm{m}}}{\partial t}=\frac{1}{\beta C_{\mathrm{m}}}\left\{\nabla\cdot\left[G_{\mathrm{i}}\nabla\left(V_{\mathrm{m}}+\phi_{\mathrm{e}}\right)\right]-\beta\left(I_{\mathrm{ion}}+I_{\mathrm{s}}\right)\right\}\ \text{with}\ \nabla\cdot\left[\left(G_{\mathrm{i}}+G_{\mathrm{e}}\right)\nabla\phi_{\mathrm{e}}\right]=-\nabla\cdot\left(G_{\mathrm{i}}\nabla V_{\mathrm{m}}\right)$$