$$
\begin{aligned}
C\frac{dV\left(t\right)}{dt} &= -I_{\mathrm{Na}}\left(t\right) - I_{\mathrm{K}}\left(t\right) - I_{\mathrm{L}}\left(t\right) + I_{\mathrm{external}}\left(t\right), \\
&= -g_{\mathrm{Na}} m\left(t\right)^{3} h\left(t\right)\left(V\left(t\right) - E_{\mathrm{Na}}\left(t\right)\right) - g_{\mathrm{K}} n\left(t\right)^{4}\left(V\left(t\right) - E_{\mathrm{K}}\left(t\right)\right) - g_{\mathrm{L}}\left(V\left(t\right) - E_{\mathrm{L}}\left(t\right)\right) + I_{\mathrm{external}}\left(t\right), \\
\frac{dm\left(t\right)}{dt} &= \alpha_{m}\left(V\right)\left(1 - m\left(t\right)\right) - \beta_{m}\left(V\right) m\left(t\right), \\
\frac{dh\left(t\right)}{dt} &= \alpha_{h}\left(V\right)\left(1 - h\left(t\right)\right) - \beta_{h}\left(V\right) h\left(t\right), \\
\frac{dn\left(t\right)}{dt} &= \alpha_{n}\left(V\right)\left(1 - n\left(t\right)\right) - \beta_{n}\left(V\right) n\left(t\right).
\end{aligned}
$$