$\theta_z = -39.0$
$\tau_{Zs} = 75.0$
$C_m = 1.0$
$V_{Na} = 55.0$
$\tau_h = -40.5$
$\tau_n = -27.0$
$\theta_a = -50.0$
$\sigma_a = 20.0$
$\theta_b = -80.0$
$\sigma_b = -6.0$
$\tau_{Bs} = 15.0$
$\sigma_m = 9.5$
$\sigma_h = -7.0$
$\sigma_n = 10.0$
$\sigma_z = 5.0$
$\sigma_k = 7.0$
$g_{Na} = 35.0$
$g_{Kdr} = 6.0$
$g_L = 0.05$
$I_{app} = 0.661914$
$g_A = 1.4$
$g_{NaP} = 0.3$
$g_Z = 1.0$
$\phi = 10.0$
$\theta_h = -45.0$
$\theta_m = -30.0$
$\theta_n = -35.0$
$\theta_p = -47.0$
$\sigma_p = 3.0$
$V_K = -90.0$
$V_L = -70.0$
$g_{syn} = 1.0$
$\tau_s = 15.0$
$\theta_s = -10.0$
$\sigma_s = -2.0$
$V(0) = -71.81327$
$hhs(0) = 0.98786$
$nns(0) = 0.02457$
$bbs(0) = 0.203517$
$zzs(0) = 0.00141$
$s_{AMPA}(0) = 0.0$

$$\frac{dV}{dt} = (-g_L \cdot (V - V_L) - I_{Na} - I_{NaP} - I_{Kdr} - I_A - I_z - I_{syn} + I_{appx})/C_m \quad (1)$$

$$\frac{dhhs}{dt} = \phi \cdot (GAMMAF(V, \theta_h, \sigma_h) - hhs)/(1.0 + 7.5 \cdot GAMMAF(V, \tau_h, -6.0)) \tag{2}$$

$$\frac{dnns}{dt} = \phi \cdot (GAMMAF(V, \theta_n, \sigma_n) - nns)/(1.0 + 5.0 \cdot GAMMAF(V, \tau_n, -15.0)) \tag{3}$$

$$\frac{dbbs}{dt} = (GAMMAF(V, \theta_b, \sigma_b) - bbs)/\tau_{Bs} \tag{4}$$

$$\frac{dzzs}{dt} = (GAMMAF(V, \theta_z, \sigma_z) - zzs)/\tau_{Zs} \tag{5}$$

$$\frac{ds_{AMPA}}{dt} = ((1 - s_{AMPA}) \cdot s_\infty(V) - s_{AMPA})/\tau_s \tag{6}$$

$$GAMMAF(VV, \theta, \sigma) = 1.0/(1.0 + exp(-(VV - \theta)/\sigma)) \tag{7}$$

$$Iappx = Iapp \tag{8}$$

$$m_\infty = GAMMAF(V, \theta_m, \sigma_m) \tag{9}$$

$$p_\infty = GAMMAF(V, \theta_p, \sigma_p) \tag{10}$$

$$a_\infty = GAMMAF(V, \theta_a, \sigma_a) \tag{11}$$

$$s_\infty(V) = 1./(1. + exp((V - \theta_s)/\sigma_s)) \tag{12}$$

$$I_{Na} = g_{Na} \cdot (m_\infty^3) \cdot hhs \cdot (V - V_{Na}) \tag{13}$$

$$I_{NaP} = g_{NaP} \cdot p_\infty \cdot (V - V_{Na}) \tag{14}$$

$$I_{Kdr} = g_{Kdr} \cdot (nns^4) \cdot (V - V_K) \tag{15}$$

$$I_A = g_A \cdot a_\infty^3 \cdot bbs \cdot (V - V_K) \tag{16}$$

$$I_z = g_Z \cdot zzs \cdot (V - V_K) \tag{17}$$

$$I_{syn} = g_{syn} \cdot (\sum_{i=1}^{N} (s_{AMPA})) \cdot V \tag{18}$$