Mode 1

$$\text{flow}_1:$$

$$\frac{du}{dt}=\varepsilon-\frac{u}{\tau_{o1}}$$

$$\frac{dv}{dt}=\frac{1-v}{\tau_{v1}^{-}}$$

$$\frac{dw}{dt}=\frac{1-\frac{u}{\tau_w^{\infty}}-w}{\tau_{w1}^{-}+\frac{\tau_{w2}^{-}-\tau_{w1}^{-}}{1+e^{-2k_w^{-}(u-u_w^{-})}}}$$

$$\frac{ds}{dt}=\left(\frac{1}{1+e^{-2k_s(u-u_s)}}-s\right)\frac{1}{\tau_{s1}}$$

$u \geq \theta_o$

$u < \theta_o$

Mode 2

$$\text{flow}_2:$$

$$\frac{du}{dt}=\varepsilon-\frac{u}{\tau_{o2}}$$

$$\frac{dv}{dt}=-\frac{v}{\tau_{v2}^{-}}$$

$$\frac{dw}{dt}=\frac{w_{\infty}^{*}-w}{\tau_{w1}^{-}+\frac{\tau_{w2}^{-}-\tau_{w1}^{-}}{1+e^{-2k_w^{-}(u-u_w^{-})}}}$$

$$\frac{ds}{dt}=\left(\frac{1}{1+e^{-2k_s(u-u_s)}}-s\right)\frac{1}{\tau_{s1}}$$

$u \geq \theta_w$

$u < \theta_w$

Mode 3

$$\text{flow}_3:$$

$$\frac{du}{dt}=\varepsilon-\frac{1}{\tau_{so1}+\frac{\tau_{so2}-\tau_{so1}}{1+e^{-2k_{so}(u-u_{so})}}}+\frac{w\cdot s}{\tau_{si}}$$

$$\frac{dv}{dt}=-\frac{v}{\tau_{v2}^{-}}$$

$$\frac{dw}{dt}=-\frac{w}{\tau_w^{+}}$$

$$\frac{ds}{dt}=\left(\frac{1}{1+e^{-2k_s(u-u_s)}}-s\right)\frac{1}{\tau_{s1}}$$

$u \geq \theta_v$

$u < \theta_v$

Mode 4

$$\text{flow}_4:$$

$$\frac{du}{dt}=\varepsilon+\frac{v(u-\theta_v)(u_u-u)}{\tau_{fi}}-\frac{1}{\tau_{so1}+\frac{\tau_{so2}-\tau_{so1}}{1+e^{-2k_{so}(u-u_{so})}}}+\frac{w\cdot s}{\tau_{si}}$$

$$\frac{dv}{dt}=-\frac{v}{\tau_{v2}^{-}}$$

$$\frac{dw}{dt}=-\frac{w}{\tau_w^{+}}$$

$$\frac{ds}{dt}=\left(\frac{1}{1+e^{-2k_s(u-u_s)}}-s\right)\frac{1}{\tau_{s1}}$$