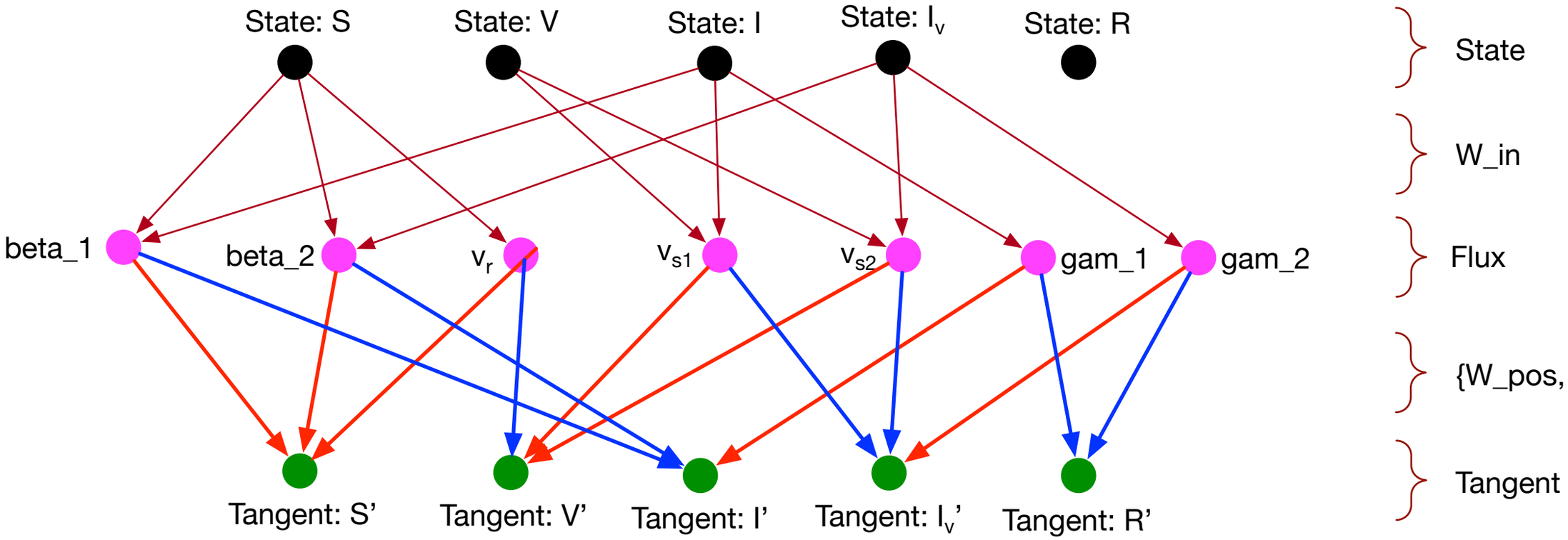
CHIME SVIIvR ODE Bilayer



Bilayer Types

- State
- W_in
- Flux
- {W_pos, W_neg} (Addition)
- Tangent

Original CHIME SVIIvR model

$$
\begin{aligned}
S' &= -\beta SI - \beta SI_v - v_r S \\
V' &= v_r S - v_s VI - v_s VI_v \\
I' &= \beta SI + \beta SI_v - \gamma I \\
I'_v &= v_s VI + v_s VI_v - \gamma I_v \\
R' &= \gamma I + \gamma I_v
\end{aligned}
$$

with 4 rates: β, v_r, v_s, γ

$$
\begin{aligned}
S' &= -\beta_1 SI - \beta_2 SI_v - v_r S \\
V' &= v_r S - v_{s1} VI - v_{s2} VI_v \\
I' &= \beta_1 SI + \beta_2 SI_v - \gamma_1 I \\
I'_v &= v_{s1} VI + v_{s2} VI_v - \gamma_2 I_v \\
R' &= \gamma_1 I + \gamma_2 I_v
\end{aligned}
$$

Now we have 7 rates: $\beta_1, \beta_2, v_{s1}, v_{s2}, v_r, \gamma_1, \gamma_2$
where $\beta_1 = \beta_2$, $v_{s1} = v_{s2}$ and $\gamma_1 = \gamma_2$.