$$
\begin{aligned}
\frac{\partial s}{\partial t} &= -\beta si \\
\frac{\partial i}{\partial t} &= \beta si - \gamma i - min(i, i^2 \frac{\theta}{(0.1 + r + s)^2})i \\
\frac{\partial r}{\partial t} &= \gamma i \\
\frac{\partial d}{\partial t} &= min(i, i^2 \frac{\theta}{(0.1 + r + s)^2})
\end{aligned}
\tag{1}
$$

$$
\begin{aligned}
s_t &= s_{t-1} - \beta s_{t-1} i_{t-1} \\
i_t &= i_{t-1} + \beta s_{t-1} i_{t-1} - \gamma i_{t-1} - \min(i_{t-1}, \frac{i_{t-1}^2 \theta}{(0.1 + r_{t-1} + s_{t-1})^2}) \\
r_t &= r_{t-1} + \gamma i_{t-1} \\
d_t &= d_{t-1} + \min(i_{t-1}, \frac{i_{t-1}^2 \theta}{(0.1 + r_{t-1} + s_{t-1})^2})
\end{aligned}
\tag{2}
$$

$$
\begin{aligned}
s_t &= s_{t-1} - \beta s_{t-1} i_{t-1} \\
i_t &= i_{t-1} + \beta s_{t-1} i_{t-1} - (\gamma + \theta) i_{t-1} \\
r_t &= r_{t-1} + \gamma i_{t-1} \\
d_t &= d_{t-1} + \min\left(i_{t-1}, \frac{i_{t-1}^2 \theta}{(0.1 + r_{t-1} + s_{t-1})^2}\right) \\
\beta &\sim \text{Beta}(m_\beta, s) \\
\gamma &\sim \text{Beta}(m_\gamma, s) \\
\theta &\sim \text{Beta}(m_\theta, s)
\end{aligned}
\tag{3}
$$