
$$\begin{cases} \frac{\partial S}{\partial t} = -\frac{\beta IS}{N} \\ \frac{\partial I}{\partial t} = \frac{\beta IS}{N} - (\alpha + \eta)I \\ \frac{\partial Q}{\partial t} = \eta I - \gamma Q \\ \frac{\partial R}{\partial t} = \gamma Q \end{cases}$$