$$\frac{\mathrm{d}S}{\mathrm{d}t} = -\frac{\beta SI}{N},$$

$$\frac{\mathrm{d}I}{\mathrm{d}t} = \frac{\beta SI}{N} - \gamma I,$$

$$\frac{\mathrm{d}R}{\mathrm{d}t} = \gamma I.$$