Model "Jeopardy"

Differential Equations

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For each system of differential equations, try to figure out what it could be a model of and a possible meaning for each parameter.

$$\begin{aligned} \frac{dX}{dt} &= rX\left(1-\frac{X}{K}\right)-\frac{kYX}{X+D}\,, \\ \frac{dY}{dt} &= sY\left(1-\frac{Y}{\gamma X}\right)\,. \end{aligned} \tag{1}$$

$$\begin{aligned} \frac{dS}{dt} &= \alpha N(1-\nu)-\mu S-\beta\frac{I}{N}S\,, \\ \frac{dI}{dt} &= \beta\frac{I}{N}S-(\mu+\gamma)I\,, \\ \frac{dR}{dt} &= (\gamma-\mu)R\,, \\ \frac{dV}{dt} &= \alpha N\nu-\mu V\,. \end{aligned} \tag{2}$$