Figure 1

a

$$y' = \frac{dy}{dt} = ky\left(1 - \frac{y}{b}\right)$$

$$y(t) = \frac{bCe^{kt}}{b + Ce^{kt}} \qquad C = \frac{y_0}{\left(1 - \frac{y_0}{b}\right)e^{kt_0}}$$

$$t_{switch} = \frac{\ln\left(\frac{b}{y_0} - 1\right)}{k} + t_0$$