Section 1.4 Generalized Logistic Equation

Theorem If $y_0 \neq 0$ and

$$\frac{1}{y_0} + \int_{t_0}^{t} q(s) e^{\int_{t_0}^{s} p(\tau) d\tau} ds \neq 0, \quad t \in I,$$

then the solution of the generalized logistic equation

$$y' = [p(t) - q(t)y]y, \quad y(t_0) = y_0, \quad t_0 \in I$$

is given by

$$y(t) = \frac{e^{\int_{t_0}^{t} p(\tau) d\tau}}{\frac{1}{y_0} + \int_{t_0}^{t} q(s) e^{\int_{t_0}^{s} p(\tau) d\tau} ds}.$$