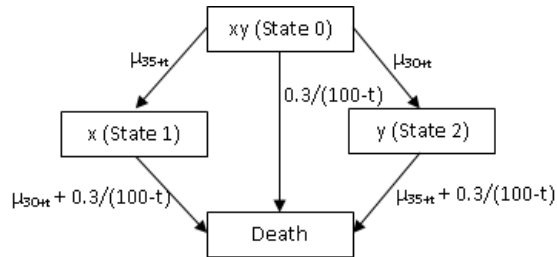


Solutions to Extra Exercise 18



We have the following differential equations.

$$\begin{aligned}
 \frac{dV_0(t)}{dt} &= 0.04V_0(t) + \mu_{35+t}(V_1(t) - V_0(t)) + \mu_{30+t}(V_2(t) - V_0(t)) + \frac{0.3}{100-t}(100000 - V_0(t)) \\
 \frac{dV_1(t)}{dt} &= 0.04V_1(t) + \left(\mu_{30+t} + \frac{0.3}{100-t} \right) (100000 - V_1(t)) \\
 \frac{dV_2(t)}{dt} &= 0.04V_2(t) + \left(\mu_{35+t} + \frac{0.3}{100-t} \right) (100000 - V_2(t))
 \end{aligned}$$

where $V_0(35) = V_1(35) = V_2(35) = 0$. $V_0(0)$ is the value of the benefit. (See maple worksheet).