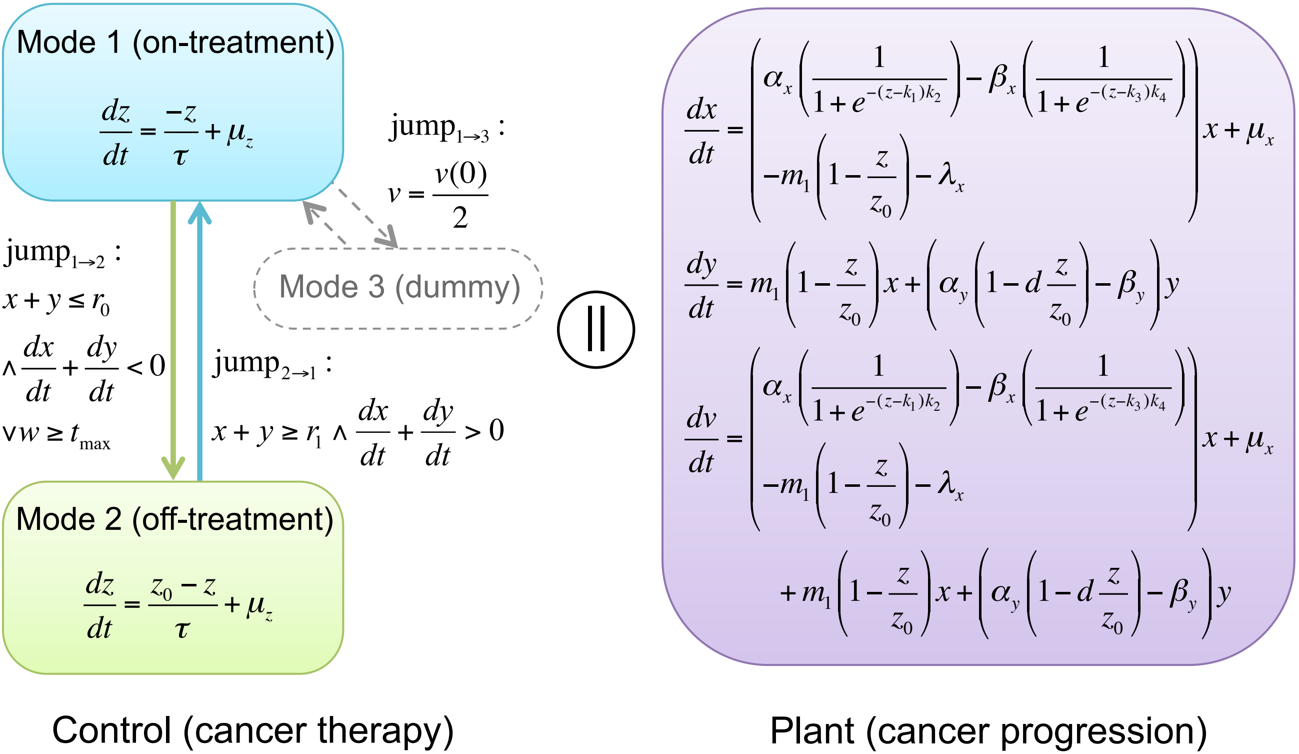
Mode 1 (on-treatment)
$\frac{dz}{dt} = \frac{-z}{\tau} + \mu_z$
$\text{jump}_{1\to 3}$:
$v = \frac{v(0)}{2}$
Mode 3 (dummy)
$\text{jump}_{1\to 2}$:
$x + y \le r_0$
$\wedge \frac{dx}{dt} + \frac{dy}{dt} < 0$
$\vee w \ge t_{\max}$
$\text{jump}_{2\to 1}$:
$x + y \ge r_1 \wedge \frac{dx}{dt} + \frac{dy}{dt} > 0$
Mode 2 (off-treatment)
$\frac{dz}{dt} = \frac{z_0 - z}{\tau} + \mu_z$
$\|$
$\frac{dx}{dt} = \left(\alpha_x \left(\frac{1}{1+e^{-(z-k_1)k_2}} \right) - \beta_x \left(\frac{1}{1+e^{-(z-k_3)k_4}} \right) - m_1 \left(1 - \frac{z}{z_0} \right) - \lambda_x \right) x + \mu_x$
$\frac{dy}{dt} = m_1 \left(1 - \frac{z}{z_0} \right) x + \left(\alpha_y \left(1 - d \frac{z}{z_0} \right) - \beta_y \right) y$
$\frac{dv}{dt} = \left(\alpha_x \left(\frac{1}{1+e^{-(z-k_1)k_2}} \right) - \beta_x \left(\frac{1}{1+e^{-(z-k_3)k_4}} \right) - m_1 \left(1 - \frac{z}{z_0} \right) - \lambda_x \right) x + \mu_x$
$+ m_1 \left(1 - \frac{z}{z_0} \right) x + \left(\alpha_y \left(1 - d \frac{z}{z_0} \right) - \beta_y \right) y$
Control (cancer therapy)
Plant (cancer progression)