$$\frac{d\mathbf{p}}{dt} = \frac{v_{txn,\mathbf{p}}}{k_{txn,\mathbf{p}} + (\mathbf{C1N} + \mathbf{C2N})^3} - \frac{v_{deg,\mathbf{p}}\ \mathbf{p}}{k_{deg,\mathbf{p}} + \mathbf{p}} \tag{1}$$

$$\frac{d\mathbf{c1}}{dt} = \frac{v_{txn,\mathbf{c1}}}{k_{txn,\mathbf{c}} + (\mathbf{C1N} + \mathbf{C2N})^3} - \frac{v_{deg,\mathbf{c1}}\ \mathbf{c1}}{k_{deg,\mathbf{c}} + \mathbf{c1}} \tag{2}$$

$$\frac{d\mathbf{c2}}{dt} = \frac{v_{txn,\mathbf{c2}}}{k_{txn,\mathbf{c}} + (\mathbf{C1N} + \mathbf{C2N})^3} - \frac{v_{deg,\mathbf{c2}}\ \mathbf{c2}}{k_{deg,\mathbf{c}} + \mathbf{c2}} \tag{3}$$

$$\begin{aligned}\frac{d\mathbf{P}}{dt} = {} & k_{tln,\mathbf{p}}\ \mathbf{p} - \frac{v_{deg,\mathbf{P}}\ \mathbf{P}}{k_{deg,\mathbf{P}} + \mathbf{P}} - v_{a,\mathbf{CP}}\ \mathbf{P}\ \mathbf{C1} + v_{d,\mathbf{CP}}\ \mathbf{C1N} \\ & - v_{a,\mathbf{CP}}\ \mathbf{P}\ \mathbf{C2} + v_{d,\mathbf{CP}}\ \mathbf{C2N}\end{aligned} \tag{4}$$

$$\frac{d\mathbf{C1}}{dt} = \mathbf{c1} - \frac{v_{deg,\mathbf{C1}}\ \mathbf{C1}}{k_{deg,\mathbf{C}} + \mathbf{C1}} - v_{a,\mathbf{CP}}\ \mathbf{P}\ \mathbf{C1} + v_{d,\mathbf{CP}}\ \mathbf{C1N} \tag{5}$$

$$\frac{d\mathbf{C2}}{dt} = \mathbf{c2} - \frac{v_{deg,\mathbf{C2}}\ \mathbf{C2}}{k_{deg,\mathbf{C}} + \mathbf{C2}} - v_{a,\mathbf{CP}}\ \mathbf{P}\ \mathbf{C2} + v_{d,\mathbf{CP}}\ \mathbf{C2N} \tag{6}$$

$$\frac{d\mathbf{C1N}}{dt} = v_{a,\mathbf{CP}}\ \mathbf{P}\ \mathbf{C1} - v_{d,\mathbf{CP}}\ \mathbf{C1N} - \frac{(vdCn - u(t))\ \mathbf{C1N}}{k_{deg,\mathbf{Cn}} + \mathbf{C1N} + \mathbf{C2N}} \tag{7}$$

$$\frac{d\mathbf{C2N}}{dt} = v_{a,\mathbf{CP}}\ \mathbf{P}\ \mathbf{C2} - v_{d,\mathbf{CP}}\ \mathbf{C2N} - \frac{((vdCn - u(t))\ m_{\mathbf{C2N}})\ \mathbf{C2N}}{k_{deg,\mathbf{Cn}} + \mathbf{C2N} + \mathbf{C1N}} \tag{8}$$