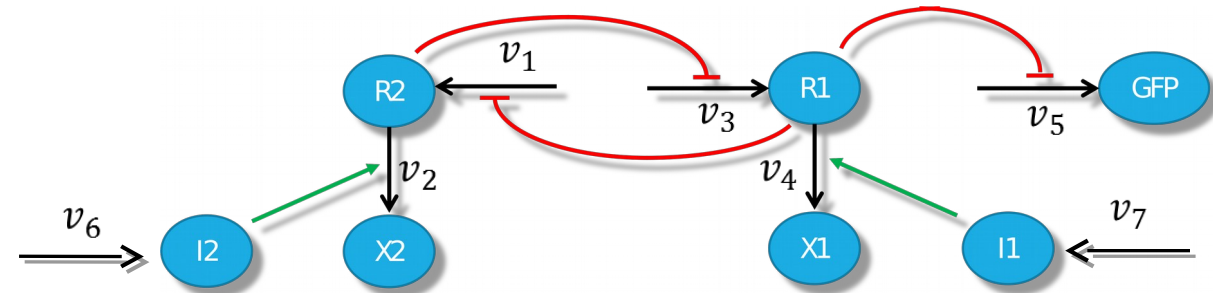


Representation of a biological system

Mathematical representation:

- vector \mathbf{X} of chemical species;
- vector \mathbf{V} of reactions rate;
- stoichiometry matrix \mathbf{S}
- vector \mathbf{d} of natural decay factor



$$\mathbf{X} = \begin{bmatrix} R1 \\ X1 \\ I1 \\ R2 \\ X2 \\ I2 \\ GFP \end{bmatrix}$$

$$\mathbf{V} = \begin{bmatrix} v_1(R1) \\ v_2(I2) \\ v_3(R2) \\ v_4(I1) \\ v_5(R1) \\ v_6 \\ v_7 \end{bmatrix}$$

$$\mathbf{S} = \begin{bmatrix} 0 & 0 & 1 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & -1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 \end{bmatrix}$$

Species

$$\mathbf{d} = \begin{bmatrix} d_{R1} \\ d_{X1} \\ d_{I1} \\ d_{R2} \\ d_{X2} \\ d_{I2} \\ d_{GFP} \end{bmatrix}$$

Reaction