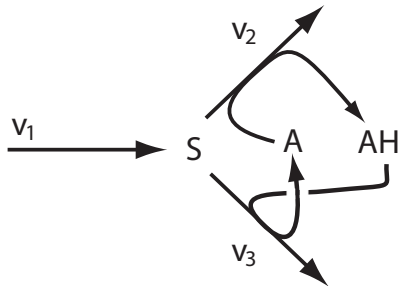
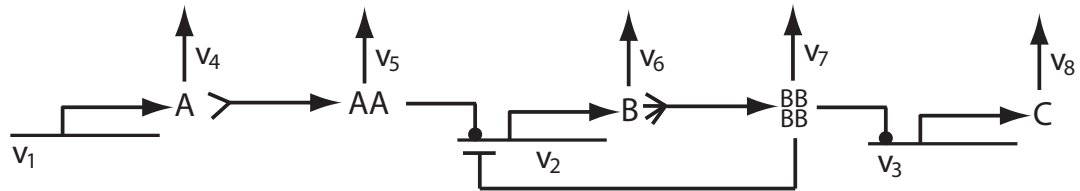


Exercises

1. Given the following network, write out the stoichiometry matrix. Assume that all stoichiometries have unit values.



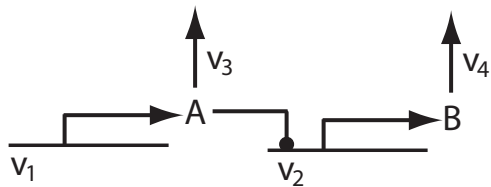
2. Given the following genetic network:



a) Write out the stoichiometry matrix.

b) Write out the differential equations that describe the rate of change of species A, AA, B, BBBB and C. Assume that the tetramer, BBBB, binds to its operator site without any cooperativity and that dimerization and tetramerization are reversible processes.

3. Given the following genetic network:



where

$$v_1 = v_1$$

$$v_2 = V_m \frac{A}{K_H + A}$$

$$v_3 = k_1 A$$

$$v_4 = k_2 B$$

a) Show that the steady state levels of A and B are given by:

$$A = \frac{v_1}{k_1}$$

$$B = \frac{v_1 V_m}{k_2 (k_1 K_H + v_1)}$$

b) What effect would changing the promoter strength of v_2 have on the steady state level of A ?

c) Explain your answer to b)

d) If $V_m = k_1 = k_2 = K_H = 1$, sketch the steady state concentration of B as a function of v_1 .