Learning goals Systems Biology Lecture

1. You know the dynamic features of the following network motifs:
    a. Simple regulation
    b. Negative auto regulation
    c. Positive autoregulation
    d. Mutual inhibition (toggle switch)
    e. Relaxation oscillator
    f. Coherent feed-forward loop
    g. Incoherent feed-forward loop

2. You are familiar with the following terms:
    a. Steady-state
    b. Response time
    c. Nullcline
    d. Bifurcation
    e. Hill-Equation
    f. Stable (unstable) fixpoint
    g. Bi-stability

3. You can calculate / know the effects of parameters on:
    a. Steady-state level of simple regulation
    b. Response time of simple regulation
    c. Fraction of promoter binding using the Hill equation

4. You can graphically derive the dynamic behavior of the coherent and incoherent feed-forward loop and can explain how parameter changes and logic gates at the z promoter affects its qualitative behavior.

5. You can interpret phase-portraits and one-dimensional flow diagrams

6. You can calculate exponential growth and competition between two exponentially growing strains

7. You have an intuition on how the timing of reproduction and rate of reproduction affect the rate of population growth.