

BIOC 455/555

Fall 2016

Homework # 5

Due at the beginning of class on Tuesday, September 27th.

Consider a symmetric co-repressive genetic circuit whose dynamics are given by the following set of ODEs:

$$\begin{aligned}\dot{x} &= \frac{\alpha}{1 + y/c} - \gamma x \\ \dot{y} &= \frac{\alpha}{1 + x/c} - \gamma y,\end{aligned}$$

where x and y are the concentrations of the two transcriptional repressors, α is the maximum transcription rate, c is the concentration of each repressor needed for half-maximal repression, and γ is the dilution rate of the proteins.

Is the above system bistable? Justify your answer.