**Problem 3: Stability analysis of Collins toggle switch**

**a).**

u&v: i. Concentration of a repressor of gene expression (there are two repressors)

alpha: ii. Effective rate of synthesis of repressor; lumped parameter that describes the net effect of RNA polymerase binding, open-complex formation, transcript elongation, transcript termination, repressor binding, ribosome binding and polypeptide elongation

n: iii. Cooperativity of repression

1: iv. Degradation rate constant for repressor

**b)-c).**

For n=1, there is one stable fix point.

For n=2, there is one unstable and two stable fixed point.

The change in cooperativity affect the stability (stable/unstable points) in systems

**The Julia code is attatched.**

**For n=1**

A picture containing game

Description automatically generated

**For n=2**

A picture containing game

Description automatically generated

**d).- f).**

**Solutions in PDF version is attached.**