

Lab Course: Modelling and Simulation (SS-2016, LSI) 5th -15th September 2016

Task 5: Perform simulations by changing the parameter V_s . Does the oscillation disappears above / below some specific value?

Task 6:

- a) Solve the differential equation system in Task 3 for fixed points and record the positive & real solution(s) only. Note that the fixed points are given by the solution set of the vector field equated to zero. You can solve a system of equation by a computer algebra system, e.g. using SAGE or its online version, or using a homotopy solver such as Bertini (which works for much higher dimensional systems).***
- b) Compute the Jacobian matrix at the positive real solution and compute the corresponding eigen values. Try to understand the significance of eigen values and what do they signify in the current example.***
- c) Solve the differential equation system for the value of the V_s for which the oscillation disappears and at which oscillation appears (cf. Task 5) and compare the respective eigen values. Explain your findings!***

You can use SAGE's online version (<https://cloud.sagemath.com/>) for solving equation systems, to compute the Jacobian matrix and the eigenvalue computations.

Good luck :)