

M4447

A script from SS2009 "[Einführung in die Theoretische Systembiologie](#)" (in German).

We will cover several topics from this lecture in the course M4447.

A jupyter notebook "[Growth Forms.ipynb](#)" with linear, exponential and logistic growth. It contains the integration of the differential equation and the plot.

A summary of the calculation with the [modified logistic growth equation](#).

Three jupyter notebooks with the implemented 2-compartment-model "[2Compartment_Model.ipynb](#)", and with the 2-compartment-model with steady state solution "[2Compartment-Model steadystate.ipynb](#)", and with the 2-compartment-model with Michael Menten-kinetics "[2Compartment_Model_MichaelMenten.ipynb](#)".

Another jupyter notebook with a 3-compartment-model "[3Compartment_Model with steadystate.ipynb](#)".

Calculation of the stationary points of the 2-compartment-model with Michaelis Menten-kinetics "[Stat_2CModel.pdf](#)".

PS-Model: Calculations of stationary points and their stability in theory "[PS-Model.pdf](#)" and as a jupyter notebook "[PS-Model.ipynb](#)".

Implementation of the Lotka-Volterra-Model: "[LV-Model.ipynb](#)".

Implementation of the 5-compartment-model: "[5Compartment-Model.ipynb](#)".

Jupyter notebook for the 2-compartment-model with autocatalysis "[2Compartment-Model_autocatalytic.ipynb](#)".

Implementation of the genetic-switch-model: "[genetic switches.ipynb](#)".

Jupyter notebook with the four dynamic behaviors (variation of the predator death rate) of the predator-prey-model with Holling Typ II predation and logistic growth of the prey "[PP-Model with Holling-Typ2- Predation.ipynb](#)".

Implementation of the Fitzhugh-Model with nullclines, stationary points and phase plot: "[Fitzhugh-Model.ipynb](#)".

Part I of the Morris-Lecar-Model with nullclines and steadystate: "[ML-Model Part 1.ipynb](#)".

Part 2 of the Morris-Lecar-Model with nullclines and steadystate: "[ML-Model Part 2.ipynb](#)".

Literature

A seminal synthetic biology paper, in which the genetic toggle switch was built in E.coli: [Gardner2000.pdf](#)

A comprehensive treatise of the Morris-Lecar model by Rinzel and Ermentrout: [Rinzel1998.pdf](#)