Github - Short README

Purpose of this project

This project deals with numerical implementation of a non-standard finite-difference-method which preserves non-negativity for a non-linear system of first-order non-linear differential equations to simulate Ca^{2+}-ion-concentrations in liver cells. A summary of analytical results and two algorithms are summarized in a preprint which can be found under

http://dx.doi.org/10.13140/RG.2.2.15416.01288

as the URL. In our first main program, the unique equilibrium state is calculated by Algorithm 1 of the aforementioned preprint. A script-based variant is given in the file named

Program1-EquilibriumStates.m.

Our second main program gives Algorithm 2 of the aforementioned preprint and is based upon a first-order non-standard finite-difference-method which preserves non-negativity. It can be expressed explicitly. A script-based variant is given in the filed named

Program2-NSFDM.m.

The results of different examples in the aforementioned preprint were produced by different scripts whose names start with 'Example...'.

Remark: If there is an interest in re-using these codes, I am planning on writing single functions for both algorithms and uploading them on this Github-project. Actually, there are just script-versions because this project solely started as a research proof of concept for the analytical results.