

A finite volume method for transport induced neurite growth

Max Winkler¹ Greta Marino² Jan-Frederick Pietschmann³

In this talk we study a free boundary model for vesicle transport on neurites taking into account neurite growth and shrinkage as well. The model consists of two PDEs describing bidirectional transport of retrograde and anterograde vesicles, ODEs describing the concentrations in the soma and the growth cones at the end of the neurites, as well as an ODE encoding a growth and shrinkage of the neurite. We give some existence and uniqueness results for the equation system, discuss steady state solutions, present a numerical computation scheme based on a finite volume discretization and compare the simulation results with biological experiments.

¹TU Chemnitz

max.winkler@mathematik.tu-chemnitz.de

²Universität Augsburg

greta.marino@mathematik.tu-chemnitz.de

³Universität Augsburg

jan-f.pietschmann@uni-a.de