

Measure solutions for a structured population model of neurogenesis

Carolin Lindow

University of Heidelberg

Abstract

Neurogenesis is the process in which neural stem cells generate new neurons. Biological experiments reveal that neural stem cells exist in two different states: active cells which proliferate and quiescent cells which do not enter the cell cycle. Recent findings using single-cell RNA sequencing data suggest that the quiescent cells exist on a continuum of states between deep quiescence and cells that are primed to enter the active state. In this talk, I will explain how I extended the compartmental model for neurogenesis proposed by Kalamakis et al. (2019) to include this continuum of cell states. To this end, I use the framework developed by Düll et al. (2021) to develop and study a model that takes values in the space of non-negative Radon measures. This allows to include discontinuous initial values and solutions that have masses in single points. The movement along the continuous maturation trajectory of the quiescent cells is represented by a transport-type process.