
OLGA VASILYEVA, Memorial University of Newfoundland - Grenfell Campus
Nonlinear Population Dynamics in River Networks

We study the population dynamics of aquatic organisms in a river network. The habitat is viewed as a tree-like metric graph with the population density satisfying a reaction-diffusion-advection equation on each segment along with the appropriate junction and boundary conditions. In the case of a linear reaction term, the question of persistence in such models was studied by Sarhad, Carlson and Anderson. We focus on the case of a nonlinear (logistic) reaction term. We obtain necessary and sufficient conditions for the existence and uniqueness of a positive steady state solution for an arbitrary river network.