Vita

Candidate's name: Ali Beykzadeh

Universities Attended:

Birjand University (1995)
Bachelor of Math

Ferdowsi University (1997)
Master of Math

University of New Brunswick (2019)
Masters of Science

Conferences Presentations/Publications:

Beykzadeh, A., & Watmough, J. (2019). An explicit formula for a dispersal kernel in a patchy landscape. bioRxiv, 680256. https://doi.org/10.1101/680256

Beykzadeh, A. (2019). Random Walks in Biology, Inter-campus seminar Day, University of New Brunswick, April 2019, Fredericton, NB.

Beykzadeh, A. (2018). Dispersal Redistribution Approximation, BioMath Days, University of Ottawa, June 2018, Ottawa, ON.

Beykzadeh, A. (2018). The Effect of Bias on the Approximation of the Non-trivial Equilibrium, CMS Summer Meeting, University of New Brunswick, June 2018 Fredericton, NB.

Beykzadeh, A., & Watmough, J. (2019). Multi-patch Laplace Dispersal across Biased Interfaces. Society of Mathematical Biology, University of Montreal, July 2019, Montreal, QC.

Multi-patch Laplace Dispersal across Biased Interfaces

UNIVERSITY OF NEW BRUNSWICK

THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

Ali Beykzadeh

in the Department of Mathematics & Statistics

U.N.B., Fredericton, N.B.

Thursday, November 14th, 2019
9:00 a.m.

Tilley Hall, Room 404

Examining Committee

Dr. James Watmough	Supervisor
Dr. Lin Wang	Internal Examiner
Dr. Myriam Barbeau	External Examiner
Dr. Tariqul Hasan	Chair of Oral Examination

Abstract

In the study of the dispersal of species across a landscape, most previous models approximate heterogeneous landscape by a set of homogeneous patches and allow for different demographic and dispersal rates within each patch. Some work has been done designing and analyzing models which also include a patch preference at the boundaries, which is commonly referred to as a degree of bias. Individuals dispersing across a patchy landscape can detect the changes in habitat at a neighbourhood of a patch boundary, and as a result, they might change the direction of their movement if they are approaching a bad patch. This thesis is devoted to the mathematical derivation of a generalization of the classic Laplace kernel, which includes different dispersal rates in each patch as well as different degrees of bias at the patch boundaries. The simple Laplace kernel and the truncated Laplace kernel most often used in classical work appear as special cases of this general kernel. The form of this general kernel is the sum of two different terms: the classic truncated Laplace kernel within each patch, and a correction accounting for the bias at patch boundaries.