PHYSICAL MATHEMATICS SEMINAR

A traveling network perspective on structure, motion, and multiscale search of connected systems

NATE CIRA

The Rowland Institute at Harvard University

ABSTRACT:

Network models play a role in understanding properties like connectivity and flow in diverse systems. Far less explored are networks where dynamic restructuring causes the network to travel from one location to another in space. In this talk I'll investigate a simple model of a "traveling network" based on a tree on which the leaves are stochastically manipulated to grow, branch, and retract, while the sum of all edge lengths is conserved. Various aspects of the network structure and motion can be derived from the underlying restructuring rates and assumptions leading to a tradeoff between global and local search. Self-organization of the network at the critical point between exponential growth and decay enables sensitive response to environmental gradients. I'll discuss how natural and artificial systems such as slime molds, the actin cytoskeleton, and human organizations can be thought of as "traveling networks" at different length and timescales.

TUESDAY, DECEMBER 3, 2019
2:30 PM – 3:30 PM
Building 2, Room 131

Reception following in Building 2, Room 290
(Math Dept. Common Room)

http://math.mit.edu/seminars/pms/

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