abstract

SPECIAL STATISTICAL MECHANICS SEMINAR
Topic:

Speaker:

Affiliation:

Date:

Time/Room:

The infinity Laplacian (informally, the "second derivative in the gradient direction") is a simple yet mysterious operator with many applications.

"Tug of war" is a two player random turn game played as follows:

SETUP: Assign each player one of two disjoint target sets T_1 and T_2 in the plane, and fix a starting position x and a constant epsilon. Place the game token at x.

GAME PLAY: Toss a fair coin and allow the player who wins the coin toss to move the game token up to epsilon units in the direction of his or her choice. Repeat the above until the token reaches a target set T_i. The ith player is then declared the winner.

Given parameters epsilon and x, write u_epsilon(x) for the probability that player one wins when both players play optimally. We show that as epsilon tends to zero, the functions u_epsilon(x) converge to the infinity harmonic function with boundary conditions 1 on T_1 and 0 on T_2.

Our strategic analysis of tug of war leads to new formulations and significant generalizations of several classical results about infinity
laplacians. The game theoretic arguments are simpler and more elementary than the original proofs.

This talk is based on joint work with Yuval Peres, Oded Schramm, and David Wilson.