Stanford University
Departments of Mathematics and Statistics

PROBABILITY SEMINAR

*** Note Special Day ***

4:30pm, Wednesday, January 6, 2016
Sequoia Hall Room 200

Speaker: Paweł Lorek
Mathematical Institute,
University of Wrocław, Poland

Title: Siegmund duality for Markov chains on partially ordered state spaces: Generalized Gambler’s Ruin problem

Abstract:
For Markov chains on finite partially ordered state space we show that a Siegmund dual exists if and only if the chain is Möbius monotone, in which case we give a formula for its transitions. Exploiting the relation between ergodic Markov chain and its Siegmund dual we give a procedure for solving ruin-like problems. As a main application we give a solution for ruin probability in some generalized Gambler’s Ruin problem. The generalization is two-fold: i) winning/losing probabilities depend on current capital; ii) it is multidimensional, i.e., involves many players.

We also show how to construct a strong stationary dual chain (with the link being truncated stationary distribution) by performing an appropriate Doob transform of the Siegmund dual of the time-reversed chain.