



WPI

DEPARTMENT OF MATHEMATICAL SCIENCES

Week of October 8-16 2018

Denksport

George Heineman

Computer Science Department WPI

Trexagon Puzzles

ABSTRACT: Mathematical and Logical puzzles are everywhere, such as Rubik's cube, the fifteen puzzle, and Sudoku. Where do these puzzles come from? What do you have to do to come up with a new puzzle? In this talk I present some background for how I invented Sujiken, a Sudoku variation. I will present a new puzzle, Trexagon, and how I came up with the idea. In a Trexagon puzzle, a diamond-shape board is formed from 21 triangles. You according to the rules of the game to determine the unique solution. We will solve some Trexagon puzzles and discuss a strategy for evaluating the difficulty of a given board.

Monday, October 8, 2018
11:00AM-11:50AM
Stratton Hall 304

Discrete Mathematics Seminar

Joseph Fehribach

WPI

Uniformity in Kirchhoff Graphs

ABSTRACT: One of the first things that might be noticed about Kirchhoff graphs is that in many but not all cases, the number of times each edge vector of occurs in the graph is constant. This talk will discuss this issue in some detail. First a linear algebraic formulation of Kirchhoff will be derived, and then this formulation will be used to show that 2-connected Kirchhoff graphs are always uniform—each edge vector occurs a fixed number of times.

Tuesday, October 9, 2018
2:00PM-2:50PM
Stratton Hall 106

Weijie Pang

WPI

XVA Valuation under market illiquidity

ABSTRACT: Before the 2008 financial crisis, most option pricing methods ignored the effects of counterparties' default and funding illiquidity. Recently models were proposed to compute the total valuation adjustment (XVA) of a European claim, including funding costs, counterparty credit risk and collateralization. However, those models abstract from an important fact: the repo market froze during the 2008 financial crisis, because of the rarity of general collateral and loss of confidence in other collaterals. The frozen repo market led to a shutdown of short trades in stock. Thus, it's very important to include the different behavior of repo and stock market in normal and financial crisis status. In our research we describe the switching between two financial status by an alternating renewal process, which switches between zero and one with inter-arrival times following exponential distributions. We develop a framework for pricing the XVA of a European claim in this state-dependent framework. We show the existence of a unique classical solution to the pricing BSDE based on a martingale decomposition theorem on a space generated by not-independent increment stochastic processes.

Tuesday, October 9, 2018
4:00pm
Stratton Hall 308

Thirty-First Annual Invitational Mathematics meet

WPI

A regional mathematics competition sponsored by the WPI Mathematical Sciences Department. Public and private schools from New England will participate in WPI's 31st Annual Invitational Mathematics Meet, bringing roughly 360 students with their advisors to campus.

Students and teams will compete against each other by completing a series of increasingly difficult math problems, which they must answer within a set amount of time to score points. The winners will receive individual and team scholarships to WPI.

Tuesday, October 16, 2018
7:45AM-2:00PM
Sports and Recreation Center