DEPARTMENT OF MATHEMATICAL SCIENCE

Week of September 17-21, 2018

Discrete Mathematics Seminar

Padriag Ó Catháin
WPI

Title Characteristic Polynomials of Hadamard matrices and incidence matrices

ABSTRACT: While a fixed graph may have many different adjacency matrices, we can speak without ambiguity of the characteristic polynomial of that graph. This is because reordering the vertices of a graph induces the same permutation on the rows and columns of the adjacency matrix, so that all adjacency matrices for a fixed graph are similar. For many other classes of combinatorical structures (e.g. projective planes or Hadamard matrices) we do not insist that all incidence matrices are similar. So an equivalence class of Hadamard matrices is associated with many different characteristic polynomials. In this talk, I will discuss some recent work with Ronan Egan and Eric Swartz in which we developed some techniques for constructing Hadamard matrices with irreducible minimal polynomials, and some applications of our result.

Tuesday, September 18, 2018
2:00PM-2:50PM
Stratton Hall 106

Seminar on Numerical Methods

Cheng Wang
UMass Dartmouth

Title: Epitaxial thin film growth model and its numerical simulation

ABSTRACT: A nonlinear PDE model of thin film growth model, with or without slope selection, are presented in the talk. A global in time solution with Gevrey regularity is established for the one with slope selection. For the numerical simulation, an idea of convex-concave splitting of the corresponding physical energy is applied, which gives to an implicit treatment for the convex part and an explicit treatment for the concave part. That in turn leads to a numerical scheme with a non-increasing energy. Both the first and second order splittings in time will be considered in the work. Some numerical simulation results are also presented in the talk.

Thursday, September 20, 2018
11:00AM-11:50PM
Stratton Hall 203

Colloquium

Daniela Calvetti
Case Western Reserve University

Title Inverse Problems, Bayesian inference and Sparse Solutions: a big of magic in L2

ABSTRACT: Recasting a linear inverse problems within the Bayesian framework makes it possible to use partial or qualitative information about the solution to improve the computed solution in spite of the inherent ill-posedness of the problem and noise in the data. In this talk we will show how a suitably chosen probabilistic setting can lead to a very efficient algorithm for the recovery of sparse solutions that only requires the solution of a sequence of linear least squares problems. The fast converge rate of the algorithm and its low computational cost will be discussed and illustrated with computed examples.

Friday, September 21, 2018
11:00AM - 12:00PM
Stratton Hall 203