

Department Colloquium

Speaker: Boris Levit, Queen's University

Date: Friday, September 18

Time: 2:30 p.m.

Place: Jeffery 234

Title: On Connection Between Optimal Design and Nonparametric Regression

Abstract: Two important statistical theories emerged around the same time in the 60s: Nonparametric Estimation and Optimal Design. Essentially, both dealt with the same problem: fitting a regression function to observed data. However, with respect to the methods used, they differed so significantly that students in one of them were often unfamiliar with the developments of the other.

Notwithstanding significant recent progress, both theories have their pluses and minuses. Nonparametric Regression can handle well infinitely dimensional classes of functions, but its approach is mostly asymptotic (large data). Optimal Design uses mainly non-asymptotic tools, but it deals exclusively with unbiased estimators and studies only finite dimensional functional classes. Both theories came to a point where they can greatly benefit by interacting with each other.

The main goal of the talk is to outline an approach to adopting infinitely dimensional classes of regression functions into Optimal Design. It is easier to start with Hardy classes of periodic analytic functions. Even that requires some radically new methods.

A bridge between the two theories will be built by combining methods of Optimal Recovery – a modern chapter of Approximation Theory, with the Jacobi elliptic functions. A new interference effect will be described involving two mutually subduing oscillating processes corresponding to the variance and the bias of the optimal interpolant.