Optimization- Math 60620

Instructor: Leonid Faybusovich
Textbook:Convexity by Roger Webster
Hours:M W F 12:50-1:40
Spring 2016

COURSE CONTENT: The goal of this course is to describe major concepts of convex optimization theory. We start with major notions of convex set, convex function, separation theorem and necessary and sufficient optimality conditions for convex optimization problems. We then consider concrete classes of linear programming and semidefinite programming problems. Various concrete examples will be considered along with introduction to the theory of convex polytopes. As an application, Nobel price winning theory of the Markowitz variance portfolio optimization will be explained. Recently a "deep learning machine" riched the level of international Grandmaster in chess within 48 hours of self-learning. While we will not try to explain this, we will discuss the role of optimization theory in machine learning and use it to introduce numerical algorithms for (hard) convex optimization problems.

Prerequisites: undergraduate courses in linear algebra , calculus and some degree of mathematical maturity.