אוניברסיטת
בן-גוריון בנגב

The Department of Mathematics

2021–22–B term

Course Name Optimization Methods with Applications

Course Number 202.1.2061

Course web page
`https://www.math.bgu.ac.il//en/teaching/spring2022/courses/optimization-methods-with-applications`

Office Hours `https://www.math.bgu.ac.il/en/teaching/hours`

Abstract

Requirements and grading[1]

Course topics

This course aims to provide algorithmic and numerical tools for solving common computational optimization problems in science and engineering. The course will include: linear algebra reminder: norms, least squares, eigenvalue and singular value decompositions, optimization of quadratic problems. Convexity, iterative methods for unconstrained optimization (Steepest Descent, Newton, Quasi-Newton, Conjugate Gradients, subspace methods, BFGS), and line-search methods. Constrained optimization with equality and inequality constraints (method of Lagrange multipliers and KKT optimality conditions), linear and quadratic programming, penalty, barrier and projection methods. Duality. Splitting methods and ADMM. Introduction to stochastic optimization (SGD). Introduction to non-smooth and sparse optimization. Robust statistics for dealing with outliers. The assignments in this course will include writing computer programs for practically implementing and demonstrating the algorithms taught in this course.

[1] Information may change during the first two weeks of the term. Please consult the webpage for updates