

The Department of Mathematics

2021–22–B term

Course Name Approximation Theory

Course Number 201.1.0121

Course web page

<https://www.math.bgu.ac.il/en/teaching/spring2022/courses/approximation-theory>

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

Abstract

Requirements and grading¹

Course topics

1. Preliminaries: floating point arithmetic, round-off errors and stability. Matrix norms and the condition number of a matrix.
2. Introduction to numerical solutions for ODE's: initial value problems, Euler's method, introduction to multistep methods. Boundary value problems.
3. Numerical solution of linear equations: Gauss elimination with pivoting, LU decomposition. Iterative techniques: Jacobi, Gauss-Seidel, conjugate gradient. Least squares approximation.
4. Numerical methods for finding eigenvalues: Gershgorin circles. The power method. Stability considerations in Gram-Schmidt: Householder reflections and Givens rotations. Hessenberg and tridiagonal forms. QR decomposition and the QR algorithm.

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