MATH 401: GREEN’S FUNCTIONS AND VARIATIONAL METHODS

Topics

• Green’s function for ODEs. (Distributional calculus with delta functions, BVPs for ODEs, Solvability Conditions, Generalized Green’s functions). (2.5 weeks)

• Green’s function for Elliptic, Parabolic, and Hyperbolic PDEs. (Method of Images, Separation of Variables, Integral representations, and applications to Electromagnetics) (3.5 weeks)

• Eigenfunction Expansions, Distribution of Eigenvalues, and Approximation of Eigenvalues (3 weeks).

• Calculus of variations and the optimization of functionals for ODEs and PDEs (3.5 weeks).

Prerequisites


• Some exposure to Physics is an asset.

References There is no official text for the course as I will provide a detailed set of online notes. However, the following references may be helpful.

• Zauderer: Partial Differential Equations of Applied Math

• Stakgold: Green’s Functions and Boundary Value Problems


• Gelfand and Fomin: Calculus of Variations

Instructor and Grading

• Michael Ward, Room 1217 Math Annex, 604-822-5869. Office Hours TBA

• There will be 1 midterm and (roughly) weekly homework assignments. The grading scheme is 30% for the midterm, 20% for the homeworks and 50% for the final exam.