

MATH/CSCI-6860-01 Finite Element Analysis
Spring 2024

Instructor: Prof. Fengyan Li (lif@rpi.edu)

Lectures: 2:00pm-3:50pm on Tuesdays and Fridays

Prerequisite: MATH-4200 or equivalent knowledge of mathematical analysis,
MATH/CSCI-4800 or equivalent knowledge of numerical methods;
Some experience with partial differential equations and computer programming

Objectives:

- ◇ To understand the mathematics behinds classical finite element methods and discontinuous Galerkin methods: formulation, matrices assembly for implementation, discrete spaces, approximation theory, stability, error estimates
- ◇ To carry out standard mathematical/numerical analysis and derivations
- ◇ To implement and to evaluate numerical methods for one- and two-dimensional problems

Main Contents: Formulation, analysis, and implementation of

- ◇ Finite element methods for elliptic (i.e. diffusion) equations, and possibly also for parabolic equations
- ◇ Discontinuous Galerkin methods for elliptic equations, convection-diffusion equations, and advection/transport equations