COURSE ANNOUNCEMENT: MTH 654/9 (Fall 2013)

FINITE ELEMENT METHODS (FEM) for Partial Differential Equations (PDEs)

www.math.oregonstate.edu/~mpesz/654_F13

The foundations of FEM in variational calculus in Hilbert spaces and elegant mathematical framework allow for excellent approximation properties and error analysis where other methods fail. **FEM** is flexible on irregular domains, with highly varying coefficients and singularities, and is widely used in various scientific and engineering applications.
Graduate students of mathematics and other science and engineering disciplines, as well as motivated undergraduates are welcome. Solid skills in real variable, linear algebra, and differential equations are required. Familiarity with numerical methods, programming, and PDEs are a plus.

Instructor:
Małgorzata Peszyńska
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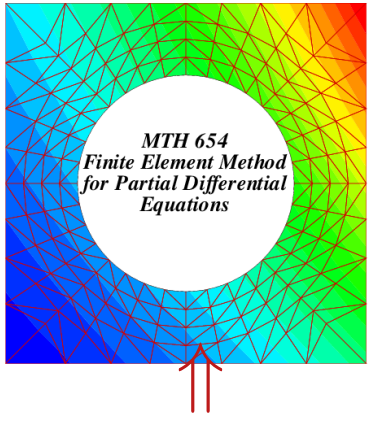
MWF 9:00-10:00



Solution to the stationary heat equation

[Please contact me if you have any questions].

Content: mathematical and algorithmic foundations of FEM such as error estimates, stability analysis, grid adaptivity, and implementation. The background in functional analysis, numerical integration, interpolation and approximation theory will be developed, and templates in MATLAB and/or other libraries will be provided. We will discuss mostly Galerkin (conforming) FEM for stationary problems, but extensions to nonstationary nonlinear problems and other "FE dialects" such as mixed and/or Discontinuous Galerkin, may be introduced.
Assignments will be a mixture of theoretical and computational exercises.