

Syllabi for 218 A (produced by Steve Shkoller, 10-12-01)

218a:

Laplace's and linear heat equation

Fundamental solution

Mean-value formula

Green's function

Energy methods

Linear wave equation

Representation of solutions and energy methods

Transform methods

Fourier, Laplace, and Similarity transforms

Linear Elliptic and Evolution equations

Distribution theory and weak solutions

Sobolev spaces

Weak derivatives and approximation of smooth function spaces

Extension and trace theorems

Basic inequalities

Gagliardo-Nirenberg

Sobolev Embedding Theorem

Second Order Elliptic Boundary Value Problems

Weak Solutions, Elliptic Regularity, and Maximum Principles

Eigenvalue Problems

Syllabi for 218 B (produced by Steve Shkoller, 10-12-01)

Second Order Parabolic Boundary Value Problems

Weak Solutions, Regularity, and Maximum Principles

Semigroup theory

Nonlinear PDEs

Galerkin methods

Contraction mapping principles

Commutator estimates

Super and Sub Solutions and viscosity solutions

Applications

Elasticity theory

Harmonic map heat flow

Motion by mean curvature

Euler and Navier Stokes Equations