

Math 716, JR 221, Wi, '09,: Introduction to PDE

The emphasis in Math 716 is on solving linear partial differential equations (PDEs) using a variety of different methods. Topics that will be discussed are:

- (1.) Linear partial differential equations, and their derivation: Laplace, diffusion, wave and transport equations.
- (2.) Method of characteristics for 1st order PDEs (both linear and nonlinear).
- (3.) General Sturm-Liouville Theory: Eigen Function expansions, special functions (Fourier and Bessel functions, ..), Separation of variables and application to 2nd order PDEs in one and two space dimensions.
4. Other solution methods: (Maximum principle and harmonic functions, Green's functions, Laplace transform, Weak solutions).

Text:

- (1.) Partial differential equations: An introduction by W.A. Strauss, John Wiley & Sons, 1992 (ISBN 0471548685)
- (2.) Additional Materials from Renardy & Rogers, Partial Differential Equations & P.R. Wallace, Mathematical Analysis of Physical Problems.

Grading Policy:

6-7 homework sets, each due 7-9 days after it is assigned. Homework will be posted on my website <http://www.math.ohio-state.edu/~tanveer> Homework will count for 50 % of grades. Take home final given out in the last week of classes and will count for another 50 %; collaboration in homework limited to discussion of approach. Turned in homework by different people should **not** look the same. **No collaboration of any kind** in the finals. If in doubt about policy, consult instructor.

Office hours:

MWF at 2:30 at my office (MW 420) or by appointment only.