UNIVERSITY OF BRITISH COLUMBIA

Math 517, Spring 2008

PARTIAL DIFFERENTIAL EQUATIONS II

This course, like Math 516 in Term 1, is an introduction to diverse aspects of the qualitative theory of partial differential equations. While Math 516 emphasizes elliptic (steady-state) problems, in Math 517 we will concentrate on evolution (time-dependent) equations. The goal is to provide a solid background for students who may encounter PDE in their research areas (for example, applied and computational mathematics, probability, geometry, mathematical physics), as well as for PDE specialists.

Instructor: Stephen Gustafson, Math 115, phone 604-822-3138, gustaf@math.ubc.ca.

Rough Course Outline:

1. Evolution equations:
   (a) linear parabolic equations (weak solutions, regularity, maximum principle)
   (b) linear hyperbolic equations (weak solutions, energy estimates, propagation speed)
   (c) semigroup theory
   (d) nonlinear evolution equations
2. Further topics chosen from among:
   (a) variational methods
   (b) geometric evolution problems
   (c) Hamilton-Jacobi equations
   (d) systems of conservation laws

Pre/co-requisites: Basic analysis, such as Math 421 (or equivalent) would be helpful, as would previous exposure to PDE.

References: A number of books will prove useful, but our basic reference is

- *Partial Differential Equations*, by Lawrence C. Evans, AMS, 1998.

Course homepage: http://www.math.ubc.ca/∼gustaf/M517/

Grading: is based on homework assignments, and a short presentation.

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