MAT 1061: Partial Differential equations II

Syllabus Winter 2009

Instructor: Frédéric Rochon	email: rochon@math.toronto.edu
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Lectures: MWF 9am BA 6183	Office hour: Tu10 or by appointment

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Textbook:

Partial differential equations, by Lawrence C. Evans

Course outline:

- Linear second order parabolic equations and the maximum principle
- Ricci flow on compact surfaces
- The calculus of variations
- The Yamabe Problem
- Nonvariational techiques to solve PDE: Fixed point methods, method of subsolutions and supersolutions, nonexistence, method of continuity
- The nonlinear Schrödinger equation

Prerequisites:

MAT1060 Partial Differential Equations I

Assignments

There will be an assignment due every two weeks or so. Each assignment will be announced in class and posted on the webpage.

Grade:

The final course grade will be be based on the assignments and the final examination weighted as follows: 50 percent for the assignments and 50 percent for the final examination.

Other references

T. Aubin, *Nonlinear Analysis on Manifolds. Monge-Ampère equations*, Springer-Verlag, 1982.

B. Chow and D. Knopf, *The Ricci flow: an Introduction*, Mathematical surveys and monographs of the AMS, volume 110, 2004.

J.M. Lee and T.H. Parker, *The Yamabe problem*, Bull. Amer. Math. Soc. **17**, no. 1 (1987) 37-91.

R. Hamilton, *The Ricci flow on surfaces*, Mathematics and General Relativity, Contemporary Mathematics, **71** (1988) 237-261.

G. Staffilani, *The theory of nonlinear Schrödinger Equations part I*, lecture notes, Clay summer school 2008.

C. Sulem and P.-L. Sulem, *The Nonlinear Schrödinger Equation*, Springer, 1999.

M. Taylor, *Partial Differential Equations III Nonlinear Equations*, Springer, 1997.