Theory of partial differential equations
MWF 9-9:50am
CB343
Spring 2013

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and by appointment.

The goal of this assignment is to dip your toe into the mathematical research literature. Be careful, or you might be swept away!!

Below is a list of suggested papers. Read one of the following papers and understand enough to fill a 40–50 minute talk. You should be able to state the main question considered in the paper and the author's solution. Give a sketch of the proof.

You may select another paper which covers original research in mathematics. All selections should be discussed with Brown before being finalize. I plan to schedule presentations during dead week and ask that the class plan to attend most of the presentations.

- Select paper in consultation with Brown, 1 February.
- February and March, read paper and meet occasionally to discuss questions.
- April write draft lecture notes and have a fellow student and Brown give suggestions.
- Dead week, 24–28 April. Presentations.

References

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[3] F. W. Gehring. The L^p-integrability of the partial derivatives of a quasiconformal mapping. *Acta Math.*, 130:265–277, 1973.

[4] Maxim J. Goldberg and Seonja Kim. Solving the Dirichlet acoustic scattering problem for a surface with added bumps using the Green's function for the original surface. *Int. J. Math. Math. Sci.*, 31(11):687–694, 2002.

[5] Lars Inge Hedberg. On certain convolution inequalities. *Proc. Amer. Math. Soc.*, 36:505–510, 1972.

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[8] C.E. Kenig, A. Ruiz, and C.D. Sogge. Uniform Sobolev inequalites and unique continuation for second order constant coefficient differential operators. *Duke Math. J.*, 55(2):329–347, 1987.

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[11] Marius Mitrea. On Dahlberg's Lusin area integral theorem. *Proc. Amer. Math. Soc.*, 123(5):1449–1455, 1995.

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[14] J. Moser. On Harnack's theorem for elliptic differential operators. *Comm. Pure Appl. Math.*, 14:577–591, 1961.

[15] B. Simon. Nonclassical eigenvalue asymptotics. *J. Funct. Anal.*, 53:84–98, 1983.

[16] Leon Simon. Schauder estimates by scaling. *Calc. Var. Partial Differential Equations*, 5(5):391–407, 1997.

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