

MA60207 - Sobolev Spaces

Professor G.R. Burton, Bath

Description:

An introductory course suitable for research students in pure or applied mathematics who have some basic background in functional analysis and Lebesgue integration.

Topics:

- Distributions and their partial derivatives.
- Distributional derivatives of functions.
- Weak solutions of partial differential equations.
- Sobolev spaces.
- Convolution.
- Mollification.
- Density of smooth functions in Sobolev spaces.
- Sobolev inequality.
- Embeddings.
- Poincare inequality.
- Rellich-Kondrachov compact embedding theorem.
- Simple examples on existence of weak solutions.
- Boundary values of Sobolev functions.
- Use of weak compactness.

Course Assessment:

Assessment, by viva, will be available for those students who require it.

Literature:

R.A. Adams and J.J.F. Fournier, *Sobolev Spaces* (2nd edn. Elsevier 2003).
L.C. Evans, *Partial Differential Equations* (2nd edn. American Math. Soc. 2010).