Lecture Announcement

"Partial Differential Equations 2"
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The aim of this course is to illustrate ideas relevant in the theory of existence and regularity of linear partial differential equations. The focus will be the so called $L^2$ theory for operators in divergence form. For instance this includes generalised / “weak” solutions to the Dirichlet problem

$$\sum_{i,j=1}^{n} \partial_i (a^{ij}(x) \partial_j u) = f \text{ in } U$$
$$u = u_0 \text{ on } \partial U$$

where the positive definite matrix $a^{ij}(x)$ and $f, u_0$ are given and $u$ is the unknown.

The $L^2$-theory provides a relative robust approach to deal with these kind of elliptic differential equations. It works as well for parabolic equations and hyperbolic equations in divergence form.

The main topics of the course will be:

1. Sobolev spaces;
2. Elliptic equations;
3. Parabolic equations;
4. Hyperbolic equations.

As reference we will use (beside others) mainly the book by C.Evans, Partial Differential Equations.

I am looking forward to welcome you in my course. Please inscribe to the moodle course to participate.

Prerequisites:

- Analysis I,II, Measure Theory
- Functional Analysis 1, PDE 1 will be helpful
- interest in PDEs and in the topic