


 Faculty of Applied Sciences

INMA2345 Variational methods, semi-groups

[30h] 3 credits

This course is taught in the 2nd semester

Teacher(s): Patrick Habets
Language: French
Level: Second cycle

Aims

Introduction to investigation methods of evolution equations in functional spaces (heat, waves, Schrödinger's, #, equations) and to variational methods in connection with boundary value problems in differential equations.

Main themes

Variational methods; Semi-groups theory; Applications.

Content and teaching methods

- Variational methods : elliptic problems on a bounded domain W (minimization theorem, mountain-pass theorem, saddle point theorem). Some cases of non-bounded domains W may be studied.
- Semi-groups theory : linear equations in \mathbb{R}^n , semi-groups of bounded operators, Hille-Yosida's theorem.
- Applications : heat equation (existence, unicity, regularity), maximum principle, waves equations, Schrödinger's equation,

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Prerequisites :

The course INMA 2315 Complements of Analysis is an obligatory preliminary.

The courses MATH 2111 Functional Analysis and INMA 2325 Ordinary Differential Equations are very helpful preliminaries.

Other credits in programs

MATH22/G Deuxième licence en sciences mathématiques (3 credits)