The Ubiquitous Heat Kernel, 7.5 hp

Course period:
lp4

Last day for application:
TBD

Course leader / Address for applications:
Julie Rowlett / julie.rowlett@chalmers.se

Course description (Advertisement for Ph.D. students):
The heat kernel is ubiquitous in mathematics and physics. We will approach it from a variety of perspectives, demonstrating its fundamental properties and exploring its applications. The precise direction this course shall take will in fact be decided together with the participants in a preliminary meeting. What is certain is that we shall study the heat kernel from several different perspectives: analytical, physical, stochastic, dynamic, and geometric. We shall also see how the heat kernel and general heat kernel methods can be applied, choosing applications based on the interests of the course participants.

We will meet twice a week (2x2) in lp4. The schedule will be decided by participants at an introductory meeting.

Responsible department and other participation departments/organisations:
Mathematics Department

Teacher:
Julie Rowlett

Examiner:
Julie Rowlett

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1. Confirmation
The syllabus was confirmed by the Head of the Department of XXX 200X-XX-XX, 200X-XX-XX.

Disciplinary domain: Science
Department in charge: Department of Mathematical Sciences
Main field of study: Mathematics

2. Position in the educational system
Elective course; third-cycle education

3. Entry requirements
Real, complex, and functional analysis

4. Course content
The course will cover a suitable subset of the following topics. The final curriculum will be decided upon during the course.

- The heat kernel from an analytic and geometric perspective
- The heat kernel from a stochastic, dynamic, and physical perspective
- Applications

5. Outcomes
At the end of the course, the students will have acquired knowledge about the heat kernel and its applications.

6. Required reading
The following list is a selection with no claims to completeness.

- TBA

7. Assessment
There will be homework consisting of typing lecture notes, and an oral exam at the end of the course.

A Ph.D. student who has failed a test twice has the right to change examiners, if it is possible. A written application should be sent to the Department.

In cases where a course has been discontinued or major changes have been made a Ph.D. should be guaranteed at least three examination occasions (including the ordinary examination occasion) during a time of at least one year from the last time the course was given.

8. Grading scale
The grading scale comprises Fail, (U), Pass (G)

9. Course Evaluation
The course evaluation is carried out together with the Ph.D. students at the end of the course, and is followed by an individual, anonymous survey. The results and possible changes in the course will be shared with the students who participated in the evaluation and to those who are beginning the course.

10. Language of instruction
The language of instruction is English.