PDEs and Hörmander vector fields

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Timetable: 8 hrs. COURSE CANCELLED

Course requirements: Sobolev spaces, PDEs.

Examination and grading: Oral exam on 1 topic chosen by the student

SSD: MAT/05

Aim: We will give an overview of PDEs associated to Hörmander vector fields. We will highlight some of the challenges and give some ideas to overcome them. We will also present some regularity results for PDEs in this setting (both order I and order II).

Course contents:

1. Vector fields and horizontal derivatives: the sub-Gradient and the sub-Laplacian.
2. Taylor's Theorem.
3. I-order PDEs: non coercive Hamiltonian and Hölder regularity.
4. II-order PDEs:
   (a) Weak solutions and intrinsic Sobolev spaces
   (b) Hypoelliptic operators, classical solutions and Hölder regularity.
5. Rescaling and horizontal derivatives: asymptotic expansion.