

Motion Planning in the Subriemannian framework

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Timetable: 16 hrs. First lecture on March 5, 2019, 11:00 (dates already fixed, see calendar), Torre Archimede, Room 2BC/30.

Course requirements: Basic notions in Differential Geometry and Analysis on manifolds

Examination and grading:

SSD: MAT/05

Aim: The "Motion Planning problem in Subriemannian geometry is the problem of ϵ -approximating a smooth non admissible path by admissible ones. The (small) ϵ here refers to approximating up to Subriemannian distance less than ϵ .

The typical "practical" applications of this problem concern kinematic robotics, obviously. The aim of the course is to give a short introduction on Subriemannian Geometry, then to present a complete theory of motion planning.

Course contents: Program of the course:

1. Sub-Riemannian Geometry (6h)
2. Corank one Motion Planning Problems (3h)
3. Corank two and three Motion Planning Problems (3h)
4. Convexity and Interpolation Entropy (3h)
5. Fast Trigonometric Oscillations (3h)
6. The Third Bracket (3h)
7. Goursat Structures (3h)

Syllabus: see <http://docenti.math.unipd.it/rossifr/gauthier2019.pdf>