MATH-423

Differential geometry of framed curves

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Cursus	Sem.	Type
Ing.-math	MA2, MA4	Opt.
Mathematics for teaching	MA2, MA4	Obl.
Mathématicien	MA2, MA4	Opt.

Language of teaching	English
Credits	5
Session	Summer
Semester	Spring
Exam	Oral
Workload	150h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Remark

Summary

The Differential Geometry of curves, tubes & ribbons

Content

This course will describe the classic differential geometry of curves, tubes and ribbons, and associated coordinate systems. We will prove various classic mathematical theorems such as the Weyl-Hotelling formula for tube volumes, and the relation between Link, Twist and Writhe, which couples differential geometry and topological invariance for closed and knotted framed curves. While we will not consider applications explicitly in this course, much of the mathematical material that will be described is central in various problems of mechanics, including nanostructures and topological fluid mechanics.

Learning Prerequisites

Required courses

1st & 2nd year courses in math or physics, (or with teacher's permission)

Recommended courses

Ordinary Differential Equations, BA Math (MATH-301)

Learning Outcomes

By the end of the course, the student must be able to:

- Expound applications of all of the material in the course
- Construct simple proofs using the material in the course

Teaching methods

Ex cathedra lecture and exercises in the classroom

Assessment methods

Written exam

Dans le cas de l'art. 3 al. 5 du Règlement de section, l'enseignant décide de la forme de l'examen qu'il communique aux étudiants concernés.

Resources

Bibliography

Will be given at the beginning of the course