MATH-513

Metric embeddings

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Cursus	Sem.	Type
Ing.-math	MA1, MA3	Opt.
Mathématicien	MA1, MA3	Opt.

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

Summary

The course aims to introduce the basic concepts and results on metric embeddings, or more precisely on approximate embeddings. This area has been under rapid development since the 90's and it has strong impact on algorithms for discrete optimization problems.

Content

- Metrics: l_p metrics, distortion
- Dimension reduction by random projections: Johnson-Lindenstrauss lemma
- Metrics of negative type
- Error correction and compressed sensing
- Lower bounds on distortion: Nonembeddability of expanders
- Bourgains Theorem

Learning Prerequisites

Recommended courses

- Linear algebra 1+2
- Introduction to Algorithms or Discrete Optimization

Assessment methods

Oral

Resources

Bibliography

Jiri Matousek: Lecture notes on metric embeddings

Ressources en bibliothèque

- Lecture notes on metric embeddings / Matousek