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598: Approximation Algorithms in Geometry

Fall 2004

Lecture notes

A more updated version of the lecture notes is available [here](#).

Tue/Thu 16:15 PM - 17:30
SC 1214.

Mailing list

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In this course, we would cover techniques used in developing efficient approximation algorithms in computational geometry and related fields. Topics covered (would hopefully) include:

1. Random sampling: epsilon-net and approximations.
2. Discrepancy.
3. Embeddings, dimension reduction, JL lemma, Bourgain's embeddings.
4. Convex shape approximation - John theorem and Dudley theorem.
5. Coresets.
6. Shape fitting in low dimensions (with or without outliers).
7. Fast clustering in low dimensions: k-center, k-median and k-means.
8. High dimensional shape fitting.
9. Approximate nearest neighbor in low and high dimensions.
10. Curve simplification, Frechet distance, and morphing width.
11. Approximating the diameter in low-dim.
12. Approximating the Euclidean TSP.
13. What is dimension? Linear classification and margin.
14. Streaming.

Emphasize would be put on open problems, and research oriented activities.

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