Geometry Seminar
March 27, 2007, Tuesday, 6:00 p.m.
Room 613, Courant Institute
251 Mercer Street, New York

Improved approximation algorithms for TSP with neighborhoods and related geometric network optimization problems

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Abstract

The Euclidean TSP with neighborhoods (TSPN) problem seeks a shortest tour that visits a given collection of n regions (*neighborhoods*). We present the first polynomial-time approximation scheme for TSPN for a set of regions given by arbitrary disjoint fat regions in the plane. This improves substantially upon the known approximation algorithms, and is the first PTAS for TSPN on regions of non-comparable sizes. Our result is based on a novel extension of the m-guillotine method. The result applies to regions that are "fat" in a very weak sense: each region P_i contains a disk of radius $\Omega(diam(P_i))$, but is otherwise arbitrary.

We also discuss approximation algorithms for other geometric network optimization problems, such as computing watchman routes in multiply connected domains and computing bounded degree spanning trees of point sets. We will report on recent progress and highlight several open problems.

For further information contact Janos Pach at pachcims.nyu.edu, or visit our website: http://www.math.nyu.edu/seminars/geometry_seminar.html