Seminar on Combinatorial Computing
November 20, Wednesday, 6:30 p.m.
Room 6417, Graduate Center
365 Fifth Avenue, New York

Testing homotopy for paths in the plane

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Abstract

In this talk we will see efficient algorithms to test if two given paths are homotopic; that is, whether they wind around obstacles in the plane in the same way. For paths specified by n line segments with obstacles described by n points, several standard ways achieve quadratic running time. For simple paths, we will discuss an algorithm that runs in $O(n \log n)$ time, which is tight. For self-intersecting paths, the problem is related to Hopcroft's problem, and we will see an algorithm that runs in $O(n^{3/2} \log n)$ time.

Joint work with Yuanxin Liu, Andrea Mantler, and Jack Snoeyink.

For further information contact Janos Pach at pachcims.nyu.edu, or visit our website: http://cs.gc.cuny.edu/~pach/