

Combinatorics Seminar

Some new results on random points in the unit square

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Abstract: Suppose that $X_1, X_2, \dots, X_n$ are chosen randomly from the unit square. (More generally from the unit cube in d dimensions).

We consider the following:

Paper 1: Travelling in randomly embedded random graphs. 1. If the points are joined by an edge with probability p , what can one say about the shortest path distance in this embedding of $G(n, p)$ as compared to the Euclidean distance.

2. To what extent can the Beardwood, Halton, Hammersley theorem on the length of the shortest TSP tour be extended to this case?

Paper 2: Separating subadditive Euclidean functionals. For many optimization problems we know that a.s. growth rate of the optimum value up to a constant, e.g. for TSP, Minimum Spanning Tree, Steiner Tree, Perfect Matching, 2-factor. We know that a.s. these optimum values are all within a constant factor of each other, but we do not in general know the

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constants and so the question arises as to whether different problems give rise to different constants. We prove that these constants are indeed different and give a negative computational consequence in respect of using the 2-factor approximation for solving the TSP via branch and bound.

Joint work with Wes. Pegden.

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