

1 Constructing and Routing on Geometric Spanners

2 Prosenjit Bose  

3 School of Computer Science, Carleton University, Canada

4 — Abstract —

5 A geometric graph $G = (V, E)$ is a graph whose vertex set V is a set of points in the plane and
6 whose edge set E is a set of segments joining vertices. Typically, the edges are weighted with the
7 Euclidean distance between their endpoints and we refer to such graphs as *Euclidean geometric*
8 *graphs*. A spanning subgraph H of a Euclidean geometric graph G is a t -*spanner* of G provided that
9 for every edge $xy \in G$, the shortest path between x and y in H has weight that is no more than
10 t times the weight of the edge xy . The smallest constant t for which H is a t -spanner of G is its
11 *spanning ratio*.

12 An online routing algorithm \mathcal{A} is an algorithm that finds a short path in a graph without having
13 full knowledge of the graph. The routing ratio of \mathcal{A} is analogous to the spanning ratio except that
14 the ratio is with respect to the weight of the path followed by the routing algorithm as opposed to
15 the shortest path. Thus, the routing ratio, by definition, is an upper bound on the spanning ratio.

16 In this talk, we will review results and present open problems on different variants of the problem
17 of constructing and routing on geometric t -spanners.

18 **2012 ACM Subject Classification** Theory of computation \rightarrow Sparsification and spanners

19 **Keywords and phrases** Geometric Spanners, Local Routing Algorithms

20 **Digital Object Identifier** 10.4230/LIPIcs.WADS.2025.35

21 **Category** Invited Talk

22 **Funding** This research is supported in part by the Natural Sciences and Engineering Research
23 Council of Canada (NSERC).



© Prosenjit Bose;

licensed under Creative Commons License CC-BY 4.0

19th International Symposium on Algorithms and Data Structures (WADS 2025).

Editors: Pat Morin and Eunjin Oh; Article No. 35; pp. 35:1–35:1

Leibniz International Proceedings in Informatics



LIPICs Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany