1061-05-158 **Diane L. Souvaine*** (dls@cs.tufts.edu), Tufts University, Department of Computer Science, 161 College Avenue, Medford, MA 02155. *Combinatorial Bounds for Geometric Connectivity Augmentation.*

The k-connectivity augmentation problem asks for the minimum number of edges needed to augment a graph to make it k-connected; k-edge-connectivity augmentation is defined analogously. In abstract graphs, the connectivity augmentation problem can be solved in linear time for $k = 2$, and in polynomial time for any fixed k. For a given planar straight-line graph, computing the minimum augmentation using noncrossing straight-line edges is NP-Hard for any $2 \leq k \leq 5$.

We focus on combinatorial bounds for geometric connectivity augmentation. First, we prove that if a geometric graph on n vertices in general position is 3-edge augmentable, then $2n - 2$ new edges are sometimes necessary and always sufficient. Next, as a step towards finding tight bounds for 3-vertex-connectivity augmentation, we prove combinatorial bounds on the minimum number of edges that are always sufficient and sometimes necessary to produce three vertex-disjoint paths from each of k interior-disjoint convex polygons to the vertices of a triangular container.

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