

An Improved Lower Bound for Minimal-Area Convex Cover for Closed Unit Curves

Authors : S. Som-Am, B. Grechuk

Abstract : Moser's worm problem is the unsolved problem in geometry which asks for the minimal area of a convex region on the plane which can cover all curves of unit length, assuming that curves may be rotated and translated to fit inside the region. We study a version of this problem asking for a minimal convex cover for closed unit curves. By combining geometric methods with numerical box's search algorithm, we show that any such cover should have an area at least 0.0975. This improves the best previous lower bound of 0.096694. In fact, we show that the minimal area of convex hull of circle, equilateral triangle, and rectangle of perimeter 1 is between 0.0975 and 0.09763.

Keywords : Moser's worm problem, closed arcs, convex cover, minimal-area cover

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