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On the curve complexity of 3-colored point-set embeddings. (English) Zbl 1467.68138

Summary: We establish new results on the curve complexity of k-colored point-set embeddings when $k = 3$. We show that there exist 3-colored caterpillars with only three independent edges whose 3-colored point-set embeddings may require $\Omega(n^{3/4})$ bends on $\Omega(n^{2/3})$ edges. This settles an open problem by M. Badent et al. [Theor. Comput. Sci. 408, No. 2–3, 129–142 (2008; Zbl 1157.68051)] about the curve complexity of point set embeddings of k-colored trees and it extends a lower bound by J. Pach and R. Wenger [Graphs Comb. 17, No. 4, 717–728 (2001; Zbl 0991.05036)] to the case that the graph only has $O(1)$ independent edges. Concerning upper bounds, we prove that any 3-colored path admits a 3-colored point-set embedding with curve complexity at most 4. In addition, we introduce a variant of the k-colored simultaneous embeddability problem and study its relationship with the k-colored point-set embeddability problem.

MSC: 
68R10 Graph theory (including graph drawing) in computer science
68U05 Computer graphics; computational geometry (digital and algorithmic aspects)

Keywords: graph drawing; point-set embedding; simultaneous embedding

Full Text: DOI

References:


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