

Povzetek

V diplomskem delu je predstavljen Problem umetnostne galerije in nekatere njegove oblike. Dokazan je izrek o NP-polnosti odločitvene oblike tega problema na ortogonalnih poligonih. Natančno je predstavljen Problem umetnostne galerije za ortogonalne poligone in za ortogonalne poligone z luknjami. Izpeljana je zgornja meja za ortogonalne poligone s stražarji v ogliščih in zgornja meja s stražarji na robu poligona. Predstavljena je tudi zgornja meja za ortogonalne poligone z luknjami.

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ključne besede: problem umetnostne galerije, NP-polnost, ortogonalni poligon, konveksna kvadrangulacija, stražar, mobilni stražar

Key words: art gallery problem, NP-completeness, orthogonal polygon, rectilinear polygon, convex quadrilaterization, guard, mobile guard

Literatura

- [1] A. Aggarwal, *The Art Gallery Theorem: its variations, applications and algorithmic aspects*, Ph. D. Thesis, Johns Hopkins Univ., 1984
- [2] I. Bjorling-Sachs, *Edge guards in rectilinear polygons*, Computational Geometry 11 (1998) 111–123
- [3] I. Bjorling-Sachs in D. L. Souvaine, *An Efficient Algorithm for Guard Placement in Polygons with Holes*, Discrete and Computational Geometry (1995) 77–109
- [4] G. Chartrand in L. Lesniak, *Graphs and digraphs*, Chapman and Hall, 1996, str. 263–264
- [5] V. Chvátal, *A Combinatorial Theorem in Plane Geometry*, Journal of Combinatorial Theory, Series B 18 (1975) 39–41
- [6] S. Fisk, *A Short Proof of Chvátal's Watchman Theorem*, Journal of Combinatorial Theory, Series B 24 (1978) 374
- [7] Z. Füredi, D. Kleitman, *The Prison Yard Problem*, Combinatorica 14 (1994) 287–300
- [8] E. Györy, F. Hoffmann, K. Kriegel in T. Shermer, *Generalized guarding and partitioning for rectilinear polygons*, Proceedings of the Sixth Canadian Conference on Computational Geometry (1994) 302–307
- [9] F. Hoffmann, *On the rectilinear Art Gallery Problem*, Graph-theoretic concepts in computer science (1990) 717–728
- [10] F. Hoffman, K. Kriegel, *A graph coloring result and its consequences for the polygon guarding problems*, SIAM J. Discrete Math. 9 (1996) 210–224
- [11] M. Juvan, P. Potočnik, *Teorija grafov in kombinatorika*, DMFA, 2000, str. 127–128

- [12] J. Kahn, M. Klawe in D. Kleitman, *Traditional galleries require fewer watchmen*, SIAM J. Algebraic and Discrete Methods 4 (1983) 194–206
- [13] A. Kündgen, *Art Galleries with Interior Walls*, Discrete and Computational Geometry 22 (1999) 249–258
- [14] D. T. Lee in A. K. Lin, *Computational complexity of Art Gallery Problems*, IEEE Transactions on information theory, vol. IT-32 (1986) 276–282
- [15] A. Lubiw, *Decomposing polygonal regions into convex quadrilaterals*, Proceedings 1st ACM Symposium on Computational Geometry (1985) 97–106
- [16] J. O'Rourke, *Galleries need fewer mobile guards: a variation to Chvátal's Theorem*, Geometriae Dedicata 14 (1983) 273–283
- [17] J. O'Rourke, *Art Gallery Theorems and Algorithms*, Oxford University Press, 1987
- [18] J. O'Rourke, T. Shermer in I. Streinu, *Illuminating convex polygons with vertex floodlights*, Proceedings of the Seventh Canadian Conference on Computational Geometry (1995) 151–156
- [19] J. O'Rourke, *An alternate proof of the rectilinear art gallery theorem*, Journal of Geometry 21 (1983) 118–130
- [20] J. R. Sack, G. T. Toussaint, *Guard placement in rectilinear polygons*, Computational Morphology (1988) 153–175
- [21] D. Schuchardt, H. Hecker, *Two NP-Hard Art Gallery Problems for Ortho-Polygons*, Math. Logical Quart. 41 (1995) 261–267
- [22] T. Shermer, *A tight bound on the combinatorial edge guard problem*, Snapshots of Computational and Discrete Geometry, vol 3 (1994) 191–223
- [23] W. T. Tutte, *A short proof of the factor theorem for finite graphs*, Canad. J. Math. 6 (1954) 347–352
- [24] J. Urrutia, *Art Gallery and Illumination Problems*, poglavje 22, str. 973–1027 v Handbook of Computational Geometry (urednika J.-R. Sack in J. Urrutia), Elsevier, 1999
- [25] J. Urrutia, *Sixth proof of the Orthogonal Art Gallery Theorem*, rokopis, 1997

- [26] S. M. Yiu, A. Choi, *Edge guards on a fortress*, Proceedings of the Sixth Canadian Conference on Computational Geometry (1994) 296–301