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On Upper Bound of Vertex Distinguishing Word Length on Vertex Labeled Graph

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The problem of vertex distinguishing on vertex labeled graphs is considered. Two vertices are called distinguishable if associated languages over the alphabet of labels are different. A linear upper bound of vertex distinguishing word length equal to half the number of vertices is obtained.

Key words: vertex labeled graphs, languages over the label alphabet, vertex equivalence.

References

1. Glushkov V. M., Tsejtlyn G. E., Yuschenko E. L. *Algebra. Iazyki. Programirovanie* [Algebra. Languages. Programming]. Kiev, Naukova dumka, 1989, 378 p. (in Russian).
2. Kapitonova Yu. V., Letichevsky A. A. *Matematicheskaia teoriia proektirovaniia vychislitel'nykh sistem* [Mathematical Theory of Computational Systems Design]. Moscow, Nauka, 1988, 298 p. (in Russian).
3. Kilibarda G., Kudryavtsev V. B., Ushchumlich Sh. Independent systems of automata on mazes. *Diskretnaya matematika*, 2003, vol. 15, no. 2, pp. 3–39 (in Russian).
4. Dudek G., Jenkin M. *Computational Principles of Mobile Robotics*. Cambridge University Press, 2000, 280 p.
5. Sapunov S. V. Ekvivalentnost' pomechennykh grafov [Vertex Labeled Graphs Equivalence. *Trudy IPMM NANU*, 2002, vol. 7, pp. 162–167 (in Russian).
6. Hopcroft J. E., Motwani R., Ullman J. D. *Vvedenie v teoriu avtomatov, iazykov i vychislenii* [Introduction to Automata Theory, Languages, and Computation]. Moscow, Izdat. dom «Williams», 2002, 528 p. (in Russian).
7. Grunsky I. S., Sapunov S. V. Reconstruction of the graph of operating environment of mobile robot by vertex-labeling sufficient for further navigation. *Iskusstvennyy intellekt*, 2012, no. 4, pp. 420–428 (in Russian).
8. Grunsky I. S., Sapunov S. V. Identifikatsiia vershin pomechennykh grafov [Vertex Identification on Vertex Labeled Graphs]. *Trudy IPMM NANU*, 2010, vol. 21, pp. 86–97 (in Russian).