PRODUCTS OF GEODESIC GRAPHS AND THE GEODETIC NUMBER OF PRODUCTS

JAKE A. SOLOFF¹, ROMMY A. MÁRQUEZ²

AND

LOUIS M. FRIEDLER²

¹ *Department of Mathematics
Brown University
Providence, RI 02912 USA*

² *Department of Computer Science and Mathematics
Arcadia University
Glenside, PA 19038 USA*

e-mail: friedler@arcadia.edu

Abstract

Given a connected graph and a vertex $x \in V(G)$, the geodesic graph $P_x(G)$ has the same vertex set as G with edges uv iff either v is on an $x - u$ geodesic path or u is on an $x - v$ geodesic path. A characterization is given of those graphs all of whose geodesic graphs are complete bipartite. It is also shown that the geodetic number of the Cartesian product of $K_{m,n}$ with itself, where $m, n \geq 4$, is equal to the minimum of m, n and eight.

Keywords: geodesic graph, geodetic number, Cartesian products.

2010 Mathematics Subject Classification: 05C12.

REFERENCES

- [1] A.P. Santhakumaran and P. Titus, *Geodesic graphs*, Ars Combin. **99** (2011) 75–82.
- [2] W. Imrich and S. Klavžar, *Product Graphs: Structure and Recognition* (Wiley, New York, 2000).
- [3] B. Brešar, M. Kovše and A. Tepeh Horvat, *Geodetic sets in graphs* in: M. Dehmer (Eds.), *Structural Analysis of Complex Networks*, Springer Science+Business Media, LLC, New York (2011) 197–218.
doi:10.1007/978-0-8176-4789-6_8

- [4] B. Brešar, S. Klavžar and A. Tepeh Horvat, *On the geodetic number and related metric sets in Cartesian product graphs*, Discrete Math. **308** (2008) 5555–5561.
doi:10.1016/j.disc.2007.10.007
- [5] F. Harary, E. Loukakis and C. Tsouros, *The geodetic number of a graph*, Math. Comput. Modelling **17** (1993) 89–95.
doi:10.1016/0895-7177(93)90259-2
- [6] G. Chartrand, F. Harary and P. Zhang, *On the geodetic number of a graph*, Networks **39** (2002) 1–6.
doi:10.1002/net.10007
- [7] J. Cáceres, C. Hernando, M. Mora, I.M. Pelayo and M.L. Puertas, *On the geodetic and the hull numbers in strong product graphs*, Comput. Math. Appl. **60** (2010) 3020–3031.
doi:10.1016/j.camwa.2010.10.001
- [8] T. Jiang, I. Pelayo and D. Pritikin, *Geodesic convexity and Cartesian products in graphs*, manuscript (2004).
- [9] Y. Ye, C. Lu and Q. Liu, *The geodetic numbers of Cartesian products of graphs*, Math. Appl. **20** (2007) 158–163.

Received 27 August 2012
 Revised 11 September 2013
 Accepted 13 January 2014