

CHARACTERIZATION OF SUPER-RADIAL GRAPHS

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Abstract

In a graph G , the distance $d(u, v)$ between a pair of vertices u and v is the length of a shortest path joining them. The eccentricity $e(u)$ of a vertex u is the distance to a vertex farthest from u . The minimum eccentricity is called the radius, $r(G)$, of the graph and the maximum eccentricity is called the diameter, $d(G)$, of the graph. The super-radial graph $R^*(G)$ based on G has the vertex set as in G and two vertices u and v are adjacent in $R^*(G)$ if the distance between them in G is greater than or equal to $d(G) - r(G) + 1$ in G . If G is disconnected, then two vertices are adjacent in $R^*(G)$ if they belong to different components. A graph G is said to be a super-radial graph if it is a super-radial graph $R^*(H)$ of some graph H . The main objective of this paper is to solve the graph equation $R^*(H) = G$ for a given graph G .

Keywords: radius, diameter, super-radial graph.

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REFERENCES

- [1] J. Akiyama, K. Ando and D. Avis, *Eccentric graphs*, Discrete Math. **56** (1985) 1–6.
doi:10.1016/0012-365X(85)90188-8
- [2] R. Aravamuthan and B. Rajendran, *Graph equations involving antipodal graphs*, presented at the Seminar on Combinatorics and Applications held at ISI, Calcutta during 14–17 December (1982), 40–43.
- [3] R. Aravamuthan and B. Rajendran, *On antipodal graphs*, Discrete Math. **49** (1984) 193–195.
doi:10.1016/0012-365X(84)90117-1
- [4] R. Aravamuthan and B. Rajendran, *A note on antipodal graphs*, Discrete Math. **58** (1986) 303–305.
doi:10.1016/0012-365X(86)90148-2
- [5] F. Buckley and F. Harary, *Distance in Graphs* (Addison-Wesley, Reading, 1990).
- [6] F. Buckley, *The eccentric digraphs of a graph*, Congr. Numer. **149** (2001) 65–76.
- [7] E. Prisner, *Graph Dynamics* (Longman, London, 1995).
- [8] G. Johns and K. Sleno, *Antipodal graphs and digraphs*, Internat. J. Math. Soc. **16** (1993) 579–586.
doi:10.1155/S0161171293000717
- [9] G. Johns, *A simple proof of the characterization of antipodal graphs*, Discrete Math. **128** (1994) 399–400.
doi:10.1016/0012-365X(94)90131-7
- [10] Iqbalunnisa, T.N. Janakiraman and N. Srinivasan, *On antipodal eccentric and super-eccentric graph of a graph*, J. Ramanujan Math. Soc. **4(2)** (1989) 145–161.
- [11] J. Boland, F. Buckley and M. Miller, *Eccentric digraphs*, Discrete Math. **286** (2004) 25–29.
doi:10.1016/j.disc.2003.11.041
- [12] J. Gimbert, M. Miller, F. Ruskey and J. Ryan, *Iterations of eccentric digraphs*, Bull. Inst. Combin. Appl. **45** (2005) 41–50.
- [13] J. Gimbert, N. Lopez, M. Miller and J. Ryan, *Characterization of eccentric digraphs*, Discrete Math. **306** (2006) 210–219.
doi:10.1016/j.disc.2005.11.015
- [14] KM. Kathiresan and G. Marimuthu, *A study on radial graphs*, Ars Combin. **96** (2010) 353–360.
- [15] KM. Kathiresan and G. Marimuthu, *Further results on radial graphs*, Discuss. Math. Graph Theory **30** (2010) 75–83.
doi:10.7151/dmgt.1477
- [16] KM. Kathiresan, G. Marimuthu and S. Arockiaraj, *Dynamics of radial graphs*, Bull. Inst. Combin. Appl. **57** (2009) 21–28.

- [17] K.M. Kathiresan and R. Sumathi, *Radial digraphs*, Kragujevac J. Math. **34** (2010) 161–170.
- [18] K.M. Kathiresan, S. Arockiaraj and C. Parameswaran, *Characterization of super-eccentric graphs*, submitted.
- [19] M.I. Huilgol, S.A.S. Ulla and A.R. Sunilchandra, *On eccentric digraphs of graphs*, Appl. Math. **2** (2011) 705–710.
doi:10.4236/am.2011.26093
- [20] N. López, *A generalization of digraph operators related to distance properties in digraphs*, Bulletin of the ICA **60** (2010) 49–61.
- [21] R.R. Singleton, *There is no irregular Moore graph*, Amer. Math. Monthly **75** (1968) 42–43.
doi:10.2307/2315106
- [22] D.B. West, Introduction to Graph Theory (Prentice-Hall of India, New Delhi, 2003).
- [23] X. An and B. Wu, *The Wiener index of the k^{th} power of a graph*, Appl. Math. Lett. **21** (2008) 436–440.
doi:10.1016/j.aml.2007.03.025

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