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# EXTREMAL UNICYCLIC GRAPHS WITH MINIMAL DISTANCE SPECTRAL RADIUS[1]

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**Abstract**

The distance spectral radius $\rho(G)$ of a graph $G$ is the largest eigenvalue of the distance matrix $D(G)$. Let $\mathscr{U}(n,m)$ be the class of unicyclic graphs of order $n$ with given matching number $m$ ($m \neq 3$). In this paper, we determine the extremal unicyclic graph which has minimal distance spectral radius in $\mathscr{U}(n,m) \setminus C_n$.

**Keywords:** distance matrix, distance spectral radius, unicyclic graph, matching.

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## References

[1] A.T. Balaban, D. Ciubotariu and M. Medeleanu, *Topological indices and real number vertex invariants based on graph eigenvalues or eigenvectors*, J. Chem. Inf. Comput. Sci. **31** (1991) 517–523.
doi:10.1021/ci00004a014

[2] R.B. Bapat, *Distance matrix and Laplacian of a tree with attached graphs*, Linear Algebra Appl. **411** (2005) 295–308.
doi:10.1016/j.laa.2004.06.017

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[3] R.B. Bapat, S.J. Kirkland and M. Neumann, *On distance matrices and Laplacians*, Linear Algebra Appl. **401** (2005) 193–209.
doi:10.1016/j.laa.2004.05.011

[4] B. Bollobás, Modern Graph Theory (Springer-Verlag, 1998).
doi:10.1007/978-1-4612-0619-4

[5] V. Consonni and R. Todeschini, *New spectral indices for molecule description*, MATCH Commun. Math. Comput. Chem. **60** (2008) 3–14.

[6] I. Gutman and M. Medeleanu, *On the structure-dependence of the largest eigenvalue of the distance matrix of an alkane*, Indian J. Chem. (A) **37** (1998) 569–573.

[7] A. Ilić, *Distance spectral radius of trees with given matching number*, Discrete Appl. Math. **158** (2010) 1799–1806.
doi:10.1016/j.dam.2010.06.018

[8] G. Indulal, *Sharp bounds on the distance spectral radius and the distance energy of graphs*, Linear Algebra Appl. **430** (2009) 106–113.
doi:10.1016/j.laa.2008.07.005

[9] Z. Liu, *On spectral radius of the distance matrix*, Appl. Anal. Discrete Math. **4** (2010) 269–277.
doi:10.2298/AADM100428020L

[10] D. Stevanović and A. Ilić, *Distance spectral radius of trees with fixed maximum degree*, Electron. J. Linear Algebra **20** (2010) 168–179.

[11] G. Yu, Y. Wu, Y. Zhang and J. Shu, *Some graft transformations and its application on a distance spectrum*, Discrete Math. **311** (2011) 2117–2123.
doi:10.1016/j.disc.2011.05.040

[12] X. Zhang and C. Godsil, *Connectivity and minimal distance spectral radius*, Linear Multilinear Algebra **59** (2011) 745–754.
doi:10.1080/03081087.2010.499512

[13] B. Zhou, *On the largest eigenvalue of the distance matrix of a tree*, MATCH Commun. Math. Comput. Chem. **58** (2007) 657–662.

[14] B. Zhou and N. Trinajstić, *On the largest eigenvalue of the distance matrix of a connected graph*, Chem. Phys. Lett. **447** (2007) 384–387.
doi:10.1016/j.cplett.2007.09.048

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