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ON TREES AS STAR COMPLEMENTS IN REGULAR GRAPHS

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Abstract

Let G be a connected r-regular graph ($r > 3$) of order n with a tree of order t as a star complement for an eigenvalue $\mu \notin \{-1, 0\}$. It is shown that $n \leq \frac{1}{2}(r+1)t - 2$. Equality holds when G is the complement of the Clebsch graph (with $\mu = 1$, $r = 5$, $t = 6$, $n = 16$).

Keywords: eigenvalue, regular graph, star complement, tree.

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References

[1] F.K. Bell and P. Rowlinson, *On the multiplicities of graph eigenvalues*, Bull. Lond. Math. Soc. **35** (2003) 401–408.
doi:10.1112/S0024609303002030

[2] J. Capaverde and P. Rowlinson, *Eigenvalue multiplicity in quartic graphs*, Linear Algebra Appl. **535** (2017) 160–170.
doi:10.1016/j.laa.2017.08.023

[3] N.E. Clarke, W.D. Garraway, C.A. Hickman and R.J. Nowakowski, *Graphs where star sets are matched to their complements*, J. Combin. Math. Combin. Comput. **37** (2001) 177–185.

[4] D. Cvetković, M. Doob, I. Gutman and A. Torğasev, Recent Results in the Theory of Graph Spectra (North-Holland, Amsterdam, 1988).

[5] D. Cvetković, P. Rowlinson and S.K. Simić, An Introduction to the Theory of Graph Spectra (Cambridge University Press, Cambridge, 2010).

[6] P. Rowlinson, *Eigenvalue multiplicity in cubic graphs*, Linear Algebra Appl. **444** (2014) 211–218.
doi:10.1016/j.laa.2013.11.036

[7] P. Rowlinson, *An extension of the star complement technique for regular graphs*, Linear Algebra Appl. **557** (2018) 496–507.
doi:10.1016/j.laa.2018.08.018

[8] P. Rowlinson, *Eigenvalue multiplicity in regular graphs*, Discrete Appl. Math. **269** (2019) 11–17.
doi:10.1016/j.dam.2018.07.023

[9] P. Rowlinson and B. Tayfeh-Rezaie, *Star complements in regular graphs: Old and new results*, Linear Algebra Appl. **432** (2010) 2230–2242.
doi:10.1016/j.laa.2009.04.022

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