

SEIDEL POLYNOMIAL FOR GRAPHS INVOLVING CONE STRUCTURES

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ABSTRACT. Seidel matrix $S(G)$ of a graph G is based on adjacency among the vertices. Polynomial associated to $S(G)$ is Seidel polynomial (S -polynomial). Prime purpose here is to study S -polynomial for graphs involving cone structures (splice and link of graphs) and hence provide explicit expressions for S -polynomial of splice and link structures which are obtained from regular graphs.

REFERENCES

- [1] S. Akbari, J. Askari and K.C. Das: *Some properties of eigenvalues of the Seidel matrix*, Linear Multilinear Algebra, **70**(2022), No. 11, 2150-2161.
- [2] R.B. Bapat: *Graphs and Matrices*, Springer, New York, 1988.
- [3] A. Berman, N. Shaked-Monderer, R. Singh and X.D. Zhang: *Complete multipartite graphs that are determined, up to switching, by their Seidel spectrum*, Linear Algebra Appl., **564**(2019), 58-71.
- [4] D. Cvetković, M. Doob and H. Sachs: *Spectra of Graphs. Theory and Applications*, Academic Press, New York, 1980.
- [5] F. Celik, U. Sanli and I.N. Cangul: *The spectral polynomials of two joining graphs: splices and links*, Bol. Soc. Parana. Mat. (3), **40**(2022), 1-12.
- [6] T. Došlić: *Splices, links, and their valence-weighted Wiener polynomials*, Graph Theory Notes N. Y., **48**(2005), 47-55.
- [7] W.H. Haemers: *Seidel switching and graph energy*, MATCH Commun. Math. Comput. Chem., **68**(2012), 653-659.
- [8] P. Hić, M. Pokorný and D. Stevanović: *Seidel integral complete split graphs*, Math. Interdiscip. Res., **4**(2019), 137-150.
- [9] J. H. van Lint and J.J. Seidel: *Equilateral point sets in elliptic geometry*, Proc. Koninklijke Nederlandse Akademie van Wetenschappen: Series A: Mathematical Sciences, **69**(1966), 335-348.
- [10] C. McLeman and E. McNicholas: *Spectra of coronae*, Linear Algebra Appl., **435**(2011), 998-1007.
- [11] P. Nageshwari and P.B. Sarasija: *Seidel energy and its bounds*, Int. J. Math. Anal. (N.S.), **8**(2014), 2869-2871.
- [12] H.S. Ramane, M.M. Gundloor and S.M. Hosamani: *Seidel equienergetic graphs*, Bull. Math. Sci. Appl., **16**(2016), 62-69.
- [13] H.S. Ramane, I. Gutman and M.M. Gundloor: *Seidel energy of iterated line graphs of regular graphs*, Kragujevac J. Math., **39**(2015), No. 1, 7-12.
- [14] H. S. Ramane, D. Patil, K. Ashoka and B. Parvathalu: *On spectral polynomial of splices and links of graphs*, Bol. Soc. Parana. Mat., **41**(2023), 1-8.
- [15] H.S. Ramane, D.D. Patil, B. Parvathalu and K. Ashoka: *Various polynomials associated to graphs involving splice and link structures*, Ann. Math. Comput. Sci., **15**(2023) 56-69.
- [16] H.S. Ramane, D. Patil and K.S. Pise: *istance spectral polynomial and distance spectral radius of splice and link of graphs*, J. Adv. Math. Stud., **14**(2021), 372-377.

Received: April 20, 2025. *Revised:* August 01, 2025.

2020 Mathematics Subject Classification: 05C31, 05C50.

Key words and phrases: Splice of two graphs, link of two graphs, S -polynomial, S -spectrum, S -energy.

- [17] J.J. Seidel: *Strongly regular graphs with $(-1, 1, 0)$ adjacency matrix having eigenvalue 3*, Linear Algebra Appl., **1**(1968), 281-298.
- [18] F. Szöllösi and P.R.J. Östergård: *Enumeration of Seidel matrices*, European J. Combin., **69**(2018), 169-184.
- [19] S.K. Vaidya and K.M. Popat: *Some new results on Seidel equienergetic graphs*, Kragujevac J. Math., **59**(2019), 335-340.
- [20] L. Wang and G. Zhao: *Seidel integral complete r -partite graphs*, Graphs Combin., **30**(2014), 479-493.

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