

COSPECTRALITY OF GAIN GRAPHS

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A gain graph Γ_ψ over a group G , also referred as a G -gain graph, is a simple graph $\Gamma = (V, E)$ whose edges, considered as oriented arcs, get a group element of G , assigned by $\psi : \vec{E} \rightarrow G$, in such a way that inverse elements are associated with opposite orientations. Gain graphs can be regarded as a generalization of simple graphs and of signed graphs. Recently, in [1] it is discussed the concept of cospectrality for gain graphs, in terms of the adjacency matrix (G -cospectrality) and of the represented adjacency matrix (π -cospectrality, where π is a representation of G on Hermitian complex matrices). This has led to routines [2, 3] to construct cospectral gain graphs, based on the well-known Godsil-McKay switching method developed for simple graphs. In this talk we survey such results.

This is based on a joint work with Aida Abiad and Antonina P. Khamova.

REFERENCES

- [1] Matteo Cavaleri and Alfredo Donno. On cospectrality of gain graphs *Special Matrices* 10: 343–365, (2022).
- [2] Matteo Cavaleri, Alfredo Donno and Stefano Spessato. Godsil-McKay switchings for gain graphs. preprint, arXiv:2207.10986v1 (2022).
- [3] Aida Abiad, Francesco Belardo and Antonina P. Khamova. A switching method for constructing cospectral gain graphs. preprint, arXiv:2304.03555 (2023).

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