Graphs with Integral Spectrum

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The spectrum of a graph is the set of eigenvalues of the adjacency matrix of the graph, together with their multiplicities. In 1974, Harary and Schwenk initiate the study of graphs with integral spectra, that is, graphs whose eigenvalues are all integral.

In this talk, we will look at integral Cayley graphs and highlight some open problems [1]. One question is whether the Cayley graph obtained from the symmetric group with respect to the generators of the form $(1, i)$ $i = 2, \ldots, n$ is integral. This graph is known as the star graph. A connection to the representation theory of the symmetric group is explored [2].

References

[1] A. Abdollahi, E. Vatandoost, Which Cayley graphs are integral? *Electron. J. Combin.* **16(1)** (2009) 17.

[2] Laszlo Babai, Spectra of Cayley Graphs. *Journal of Combinatorial Theory* **27B** (1979) 180–189.