# ON DUAL ADJACENCY MATRIX (CANDIDATE) AND (WEAKLY) UNIFORM STRUCTURE

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## Abstract

In this talk, we investigate the connection between two properties of bipartite graphs: *Q-polynomiality* and *uniform structure*. To this end, we introduce the concept of a *dual adjacency matrix candidate* and define a *weakly uniform structure* by slightly relaxing the standard conditions for a uniform structure [1]. Our main result [2] establishes a one-to-one correspondence between these two concepts:

**Main Theorem.** *A bipartite graph $\Gamma$ admits a dual adjacency matrix candidate with respect to $x$ and corresponding parameters $\beta$, $\rho$ if and only if $\Gamma$ admits a weakly uniform structure with respect to $x$; in particular, for $\beta = 2$, the weakly uniform structure coincides with a standard uniform structure.*

## References

[1] P. Terwilliger. *The incidence algebra of a uniform poset*, Coding theory and design theory **20**(1) (1990), 193–212.

[2] B. Fernández, R. Maleki, Š. Miklavič, G. Monzillo. *On the uniform structure of bipartite graphs admitting a dual adjacency matrix candidate*, Journal of Algebraic Combinatorics (2026).

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