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Counting graph orientations with no directed triangles

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Abstract

Alon and Yuster proved that the number of orientations of any n -vertex graph in which every triangle is transitively oriented is at most $2^{\lfloor n/4 \rfloor}$ for $n \geq 10^4$ and conjectured that the precise lower bound on n should be $n \geq 8$. We confirm their conjecture and, additionally, characterize the extremal families by showing that the balanced complete bipartite graph with n vertices is the only n -vertex graph for which there are exactly $2^{\lfloor n/4 \rfloor}$ such orientations..

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