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Packing Odd-Circuits in Eulerian Graphs

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Abstract Let \mathcal{C} be the clutter of odd circuits of a signed graph (G, Σ) . For nonnegative integral edge-weights w , we are interested in the linear program $\min(w^t x : x(C) \geq 1 \text{ for } C \in \mathcal{C}, \text{ and } x \geq 0)$, which we denote by (P) . Solving the related integer program is clearly equivalent to the maximum cut problem, which is NP-hard. Guenin proved that (P) has an optimal solution that is integral so long as (G, Σ) does not contain a minor isomorphic to $\text{odd-}K_5$. We generalize this by showing that, if (G, Σ) does not contain a minor isomorphic to $\text{odd-}K_5$ then (P) has an integral optimal solution and its dual has a half-integral optimal solution.