A dual "Hoffman Bound" for the Coclique Number Based on SDP

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Hoffman introduced in the 1970's a classical spectral lower bound for the chromatic number of a graph. Hoffman's bound can be strengthened using weighted adjacency matrices, leading to the Lovász theta number of a graph. We introduce a new (weighted) graph parameter defined by a semidefinite program which is dual (in the precise sense of gauge polarity) to this Hoffman bound, and which upper bounds the coclique number of a graph. When applied to regular graphs, it yields the Delsarte-Hoffman (ratio) bound, thus proving that these two distinct bounds are duals in a precise sense.

This is joint work with Marcel K. de Carli Silva and Nathan Proença.