

# Bounds on independence

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A set of vertices of a graph is *independent* if it does not contain any pair of adjacent vertices. The *Maximum Independent Set* problem is to find an independent set with maximum cardinality. The *independence number*  $\alpha(G)$  of a graph  $G$  is the largest cardinality of an independent set in  $G$ . The Maximum Independent Set problem gained a significant interest both in theoretical investigations and in context of various applications. It is known to be NP-hard and hard to approximate. In view of the computational hardness a lot of effort was put into establishing bounds on  $\alpha(G)$ . Lower bounds on  $\alpha(G)$  are well investigated, however, upper bounds have barely been touched in the literature. We present some lower bounds on  $\alpha(G)$  and develop upper bounds in terms of eigenvalues and generalized eigenvalues of  $G$ .