

# New Results on Graph-Theoretic Independence

*Craig Larson*, Virginia Commonwealth University

## Abstract

An independent set in a graph is a set of vertices which are pairwise non-adjacent. The independence number is the cardinality of a largest independent set. Finding maximum independent sets and calculating the independence number of a graph are widely studied NP-hard problems. Applications include chemistry and communication theory.

In this talk a graph decomposition is described: any graph can be decomposed into two subgraphs, one of which is König-Egerváry and the other of which has the property that every non empty independent set  $I$  has more than  $|I|$  neighbors. One consequence is an improved bound on the size of the core of a graph. Many other consequences remain to be pursued. Some open problems are described.

**Keywords:** graph decomposition, independent sets