Counting Connected Sets and Connected Partitions of a Graph

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Two related enumeration problems on vertex labeled graphs will be discussed. Given such a graph G, we introduce and investigate the number $C(G)$ of connected subsets of the vertex set and the number $P(G)$ of connected partitions of the vertex set. By *connected* we mean that the induced subgraphs are connected. The numbers $C(G)$ and $P(G)$ can be regarded as the graph analogs of the number of subsets and the number of set partitions, respectively, of an n-element set.