Linear similarity of graphs

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Two finite graphs are cospectral if and only if their adjacency matrices A and A' are satisfy

$$A = PA'P^{-1}$$

for some invertible complex matrix P. If P can be chosen to be as a permutation matrix then the graphs are isomorphic. We consider examples of intermediate situations where P is a unimodular integral matrix, or an invertible matrix over a ring of algebraic integers.