

Indistinguishable trees and graphs
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We show that a number of graph invariants are, even combined, insufficient to distinguish between nonisomorphic trees or general graphs. Among these are: the set of eigenvalues (equivalently, the characteristic polynomial), the number of independent sets of all sizes or the number of connected subgraphs of all sizes. We therefore extend the classical theorem of Schwenk that almost every tree has a cospectral mate, and we provide an answer to a question of Jamison on average subtree orders of trees. The simple construction that we apply for this purpose is based on finding graphs with two distinguished vertices (called pseudo-twins) that do not belong to the same orbit but whose removal yields isomorphic graphs. This is joint work with Stephan Wagner.