1150-05-32 **David Galvin*** (dgalvin1@nd.edu), Department of Mathematics, University of Notre Dame, Notre Dame, IN. *Independent set permutations and matching permutations.*

In 1987 Alavi, Malde, Schwenk and Erdős showed that the independent set sequence of a graph is unconstrained in terms of its pattern of rises and falls, in the following sense: for any $m \in \mathbb{N}$ and any permutation π of $\{1, \ldots, m\}$ there is a graph with largest independent set having size m, and with

$$i_{\pi(1)} \leq i_{\pi(2)} \leq \cdots \leq i_{\pi(m)},$$

where i_k is the number of independent sets of size k in the graph. Their construction yielded a graph with around m^{2m} vertices, and they raised the following question:

> Determine the smallest order large enough to realize every permutation of order m as the sorted indices of the vertex independent set sequence of some graph.

We answer this question exactly. Alavi et al. also observed that the *matching* sequence of a graph is, by contrast, quite constrained — at most 2^{m-1} permutations of $\{1, \ldots, m\}$ can be realized as the sorted indices of the matching sequence of some graph. They asked whether the upper bound of 2^{m-1} was optimal; we show that it is not. Many open problems remain in this area.

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