Symmetry breaking of hypercube families

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One way to measure the symmetry of a graph is to quantify what it takes to block nontrivial automorphisms. For example, we could color the vertices and require that automorphisms preserve vertex color as well as adjacency and nonadjacency. More precisely, a graph G is d-distinguishable if there is a coloring of the vertices with colors $\{1, \ldots, d\}$ so that the only automorphism that preserves the color classes is the identity. The *distinguishing number* of G, denoted $\text{Dist}(G)$, is the minimum d such that G is d-distinguishable. Another strategy is to require that automorphisms fix a subset of vertices. A set S of vertices is a *determining set* for a graph G if the only automorphism that fixes all vertices in S is the identity. The *determining number* of G, denoted $\text{Det}(G)$, is the minimum size of a determining set. We will look in particular at these symmetry parameters for hypercubes and related graph families.

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