

Hamiltonian Path Variants in Structured Graph Families

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Variants on the Hamiltonian path problem have polynomial algorithms on certain structured graph families. Usually in these cases there also is a polynomial certificate of optimality and a corresponding characterization theorem. We will examine a subset of several versions for covering the vertices of a graph with paths or walks: Path partitions (minimum number of vertex disjoint paths to cover the vertices), Path covers (minimum number of edge disjoint paths needed to cover the vertices), Fixed endpoint path partition (certain vertices specified to be ends of paths), Open k -walk number (minimum k such that there is a walk covering the vertices with each vertex appearing at most k times), Hamiltonian walk number (minimum length of a walk covering all vertices). We will see the sorts of characterization theorems we can get in highly structured families such as 2-trees, block graphs, unit interval graphs and threshold graphs and some limits to extending to larger classes. Includes results from several students.

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