Min-max Theorems for the \(k\)-Path Partition Problem

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The 1-Hamiltonian Path problem is to test if there is a Hamiltonian path with a given vertex as one of the ends. This generalizes to the \(k\)-Path partition problem, which is to find a minimum partition into paths where \(k\) given vertices must be ends of paths. There are efficient algorithms for this problem on several structured graph classes. For several of the simplest of these classes, unit interval graphs, threshold graphs, block graphs, we present min-max characterization theorems. These results are surprisingly complex given the elementary structure of these classes.