

Abstract

Matroids are an abstraction of linear dependence according to H. Whitney in his seminal paper on matroid theory. They are extremely flexible systems, and can be characterised in a number of diverse ways, in this paper we focus on matroids formed on graphs. In particular, this paper focuses on the optimality of the greedy algorithm in solving optimisation problems in graph theory such as the minimal spanning tree problem which can be shown to be solved in this way when the independent sets of the graph forms a matroid. Furthermore, we show that matroids are the only hereditary systems for which this is true. The paper concludes with some insight into other set-systems which provide optimal solutions for combinatorial optimisation problems through the greedy algorithm.