Not All γ -Sets Are Equal

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Abstract

Much of combinatorial optimization, and graph theory, focuses on finding an optimum solution to a difficult, usually NP-complete, problem. Success is measured by finding a solution. But in the real world, this is seldom the case. People would much prefer to see lots of solutions so that they can choose among them, based on other, often unspecified, criteria. We illustrate this with the problem of finding a smallest dominating set, called a γ -set, in an arbitrary tree T. We present a tree T having lots of γ -sets and then ask, which of these γ -sets are better than others? This leads to the notion of *doubly optimal solutions* and the need for methods to find them. We discuss two possible methods for finding doubly optimal solutions in trees.