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**Abstract**

In the classical general framework of the minimum spanning tree problem for a weighted graph we consider the case in which a predetermined vertex has a certain fixed degree. In other words, given a weighted graph $G$, one of its vertices $v_0$ and a positive integer $k$, we consider the problem of finding the minimum spanning tree of $G$ in which the vertex $v_0$ has degree $k$, that is the number of edges coming out of $v_0$.

We prove that for the solution of the constrained problem the classical "greedy algorithm" can still be used. We recall that among the various methods for the solution of the unconstrained problem an efficient way to find the minimum spanning tree is based on the simple procedure of choosing an edge of minimum weight that has not be chosen yet and does not create cycles if added to the previously chosen edges. A similar technique works also in the constrained case, by considering the necessity of satisfy the constraint on the degree of $v_0$.

We prove also that the greedy technique in some cases does not correctly solve the problem if we have two edges with a constrained degree. We try to investigate the reason of this, by relating the two problems with the more general matroid theory.

**Keywords.** Graph theory, Trees, Minimum spanning tree problem, Matroid theory

**AMS Classification.** 05C05, 05C85

**JEL Classification.** C650, C690