

On graphs with prescribed neighborhood degrees of vertices

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Let $G = (V, E)$ be a symmetric graph with n vertices and let $\deg(v)$ denote the degree of vertex v in G . We define a **neighborhood degree** of a vertex v , denoted by $n\text{-degree}(v)$, as the sum of the degrees of its neighbors.

Suppose we are given a set of n positive integers \mathbf{d} . There are several conditions and algorithms which can be used to decide whether \mathbf{d} is a degree sequence of a graph. We show however that it is NP-hard to decide whether \mathbf{d} is an n -degree sequence of a graph even in the class of caterpillars. We present also a polynomial time algorithm for a special case of the problem.