SOME REMARKS ON THE STRUCTURE OF STRONG $k$-TRANSITIVE DIGRAPHS

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Abstract

A digraph $D$ is $k$-transitive if the existence of a directed path $(v_0, v_1, \ldots, v_k)$, of length $k$ implies that $(v_0, v_k) \in A(D)$. Clearly, a 2-transitive digraph is a transitive digraph in the usual sense. Transitive digraphs have been characterized as compositions of complete digraphs on an acyclic transitive digraph. Also, strong 3 and 4-transitive digraphs have been characterized.

In this work we analyze the structure of strong $k$-transitive digraphs having a cycle of length at least $k$. We show that in most cases, such digraphs are complete digraphs or cycle extensions. Also, the obtained results are used to prove some particular cases of the Laborde-Payan-Xuong Conjecture.

Keywords: digraph, transitive digraph, $k$-transitive digraph, quasi-transitive digraph, $k$-quasi-transitive digraph, Laborde-Payan-Xuong Conjecture.

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References


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