Longest path-partitions in generalizations of tournaments

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Abstract

We consider the so-called Path Partition Conjecture for digraphs which states that for every digraph, $D$, and every choice of positive integers, $\lambda_1, \lambda_2$, such that $\lambda_1 + \lambda_2$ equals the order of a longest directed path in $D$, there exists a partition of $D$ into two digraphs, $D_1$ and $D_2$, such that the order of a longest path in $D_i$ is at most $\lambda_i$, for $i = 1, 2$.

We prove that certain classes of digraphs, which are generalizations of tournaments, satisfy the Path Partition Conjecture and that some of the classes even satisfy the conjecture with equality.

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