Packing of two digraphs into a transitive tournament

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Abstract

Let $\overrightarrow{G}$ and $\overrightarrow{H}$ be two oriented graphs of order n without directed cycles. A. Goerlich, M. Pilśniak and M. Woźniak proved ([6]) that if the number of arcs in $\overrightarrow{G}$ is sufficiently small (not greater than $\frac{3(n-1)}{4}$) then two copies of $\overrightarrow{G}$ are packable into the transitive tournament TT_n. This bound is best possible.

In this paper we give a generalization of this result. We show that if the sum of sizes of $\overrightarrow{G}$ and $\overrightarrow{H}$ is not greater than $\frac{3}{2}(n-1)$ then the digraphs $\overrightarrow{G}$ and $\overrightarrow{H}$ are packable into TT_n.