

13th WORKSHOP
'3in1' GRAPHS 2004
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## PROBLEM PRESENTED AT THE

 WORKSHOP IN KRYNICA 2004This is a problem by Michael Kubesa, Technical University Ostrava, presented by Dalibor Froncek.

Let $K_{2 n}$ be a complete graph and $T$ a tree, both with $2 n$ vertices. A $T$-factorization of $K_{2 n}$ is a collection of edge disjoint spanning subgraphs (i.e., factors) $T_{1}, T_{2}, \ldots, T_{n}$ of $K_{2 n}$, all isomorphic to $T$. Every edge of $K_{2 n}$ then appears in exactly one copy of $T$.
M. Kubesa asked the following question: Suppose that there exists a $T$-factorization of $K_{2 n}$. Is it then true that the vertex set of $T$ can be decomposed into two subsets, $X$ and $Y$, such that
(1) $|X|=|Y|=n$,
(2) $\sum_{x \in X} \operatorname{deg}(x)=\sum_{y \in Y} \operatorname{deg}(y)$ ?

Notice that the sets $X, Y$ in general are not the partite sets of the bipartition of $T$.

