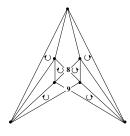
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## PROBLEM PRESENTED AT THE WORKSHOP IN KRYNICA 2004

## This is a problem by Michael Kubesa, Technical University Ostrava, presented by Dalibor Froncek.

Let  $K_{2n}$  be a complete graph and T a tree, both with 2n vertices. A *T*-factorization of  $K_{2n}$  is a collection of edge disjoint spanning subgraphs (i.e., factors)  $T_1, T_2, \ldots, T_n$  of  $K_{2n}$ , all isomorphic to T. Every edge of  $K_{2n}$  then appears in exactly one copy of T.

M. Kubesa asked the following question: Suppose that there exists a T-factorization of  $K_{2n}$ . 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)  $\sum_{x \in X} \deg(x) = \sum_{y \in Y} \deg(y)$ ?

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