

Institut für Optimierung und Diskrete Mathematik

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A special case of the data arrangement problem on binary trees

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The data arrangement problem on regular trees (DAPT) consists of assigning the vertices of a given graph G to the leaves of a d -regular tree T such that the sum of the pairwise distances of all pairs of leaves in T which correspond to edges of G is minimised. Luczak and Noble have shown that this problem is NP-hard for every fixed $d \geq 2$. The question about the computational complexity of the DAPT in the case where the guest graph is a tree is still open.

We deal with one special case of this problem where both the guest and the host graph are binary regular trees. First, we provide a solution algorithm which clearly yields an upper bound. Then we introduce and solve the k -balanced partitioning problem (k -BPP) of a binary regular tree for particular choices of k and show that a lower bound for the original problem can be derived by solving h instances of k -BPP, where h is the height of the host graph T .

By combining both bounds we obtain an approximation algorithm for the special case of DAPT.

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