

Efficient Parallel Strategies for Hanoi Games

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We focus on parallel strategies for Hanoi games. Two models of parallel moves are considered, the 1-step and the 2-step model. Except for allowing parallel movements of disks, the usual rules of Hanoi games apply. We concentrate on the complete graphs on three (K_3) and four (K_4) nodes. We first formulate algorithms on K_3 for both models and prove carefully that they are optimal in the number of moves. Then we consider K_4 . For sequential moves, the Frame-Stewart construction is used to obtain an algorithm that is widely believed to be optimal (but has never been proven so). This construction consists of splitting the total number of disks (n) into two groups, s and $n-s$, and moving first the group consisting of the smallest s disks to a node, using four nodes, then moving the remaining $n-s$ disks to the destination node using three nodes, and finally moving the s smallest disks to the destination node. We adapt this construction to each of the two models of parallelism and study the corresponding algorithms. We also obtain preliminary results on the total number of moves and the corresponding splitting numbers.

Keywords: Towers of Hanoi, parallel moves, Frame-Stewart construction, splitting numbers.
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Scheduling Request

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Thank you!

Gerard Vanloo