

## LITERATURE RECEIVED

### PARALLELE SPIELBAUMSUCHE

(Parallel Game-Tree Search)

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The report dated December 31, 1987, is written in German and describes parallel implementations of a chess program. The original abstract has been roughly translated into English as presented below.

#### ABSTRACT

In this work we present two parallelizations of game-tree search algorithms. One is a parallelization of the alpha-beta algorithm and the other, on the same hardware and the same chess program, a parallelization of SSS\*. In the introduction the problem is presented and explained by means of an example. Then some definitions are offered, from which some simple results are given, and are followed by further results about game trees. In the third part of the introduction we give a short description of the hardware used.

In the second Section, the sequential algorithms alpha-beta and SSS\* are explained and some properties of the algorithms are also described. The contribution of this Section consists of a comparison of the two algorithms on a time-and-space complexity basis, as it was shown by our experiments.

In the third Section a parallel alpha-beta algorithm is presented, its correctness proved, and its behaviour in special circumstances is explained on theoretical grounds. At the end, the experimental results are provided together with the foundation for these data.

The fourth Section describes the parallelization of SSS\*. First the approach of Kumar and Kanal is presented and analysed. Then another parallelization concept is examined which takes greater account of the relationship of SSS\* with the general concept of the Branch-and-Bound method. The last part of this Section is once more devoted to the description and significance of the experimentally obtained data. In conclusion some reflections are provided which explain the performance of the SSS\* algorithm.

Copies may be available at request at:

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