



# Game Tree Searching by Min/Max Approximation

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## Paper's Goal:

This paper by Ronald L. Rivest, at Laboratory for Computer Science, MIT, Cambridge, mainly presents an iterative method in order to search min/max game trees. This topic is based on approximating the (min) and (max) operators and this is accomplished by generalized mean-valued operators. That specific approximation is used in order to help in selecting the next leaf node so it would expand. This is due to the efficiency of those approximations as they allow the selection of that specific leaf node, which approximate value at the root mostly depends on, in a methodical way.

## Techniques Used:

The paper introduces a new technique to search game trees. This technique is based on approximating the min and max operators with generalized mean-value operators.

The main reason generalized means are of great use is because they are suitable to get a sensitive analysis done. In fact, they are more suitable than the min or max functions as well.

## Paper's Results:

The experiments' results applied on 1000 games of the famous game (Connect Four), proposes that the scheme offered by this paper is more exceptional as well as remarkable than the minimax search algorithm with alpha-beta pruning. This was tested upon the same number of calls that are required to implement the routine of move. However, the scheme represented has higher overhead and the author referred that this should be taken into consideration when doing further work or research on the same topic as it not possible to be competitive in the time being due to a main limiting resource which is the CPU time per turn.