ENHANCED REALIZATION PROBABILITY SEARCH

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Abstract: In this paper, we show that Realization Probability Search (RPS) significantly improves the playing strength of a world-class Lines-of-Action (LOA) computer program, even when used in combination with existing state-of-the-art Î±Î² search enhancements. In a 600-game match, a RPS-based version of the program defeats the original one with a winning score of 62.5%. The main contribution of the paper, however, is the introduction of a much improved variant of RPS, called Enhanced Realization Probability Search (ERPS). The new algorithm addresses two weaknesses of RPS and overcomes them by using a better focussed re-searching scheme, resulting in both more robust tactical play and reduced search overhead. Our experiments in the domain of LOA show that ERPS offers just as a significant improvement over regular RPS, as the latter improves upon regular search. More specifically, the ERPS-based variant scores 62.1% against the RPS variant, and an impressive 72.2% score against the original program. This represents an improvement of over 100 ELO points over the original state-of-the-art player.

Keywords: Search; heuristics; games (search for similar items in EconPapers)
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