Potentially Optimal Sequence-Sets in Shop Scheduling Problems

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Abstract

A set of sequences in shop scheduling problem $\alpha|\beta|\gamma$ is known as *potentially optimal* if it contains an optimal sequence for arbitrary numerical data. The set of all irreducible sequences in classical shop problem is an example, but a study of the existence and uniqueness of such a minimal set for large problem size is quite hard. A sequence is called *irreducible* if there exists no better sequence replacing it for arbitrary numerical data.

Investigations of these structures are believed to provide a useful tool to improve exact and heuristic algorithms on more practical problems with uncertain input data. We illustrate a generalization of irreducibility.

Furthermore, on the counting problem, we give an idea of how to count sequences by counting non-sequences. Basically, cyclic orientations of the complete Hamming graph $K_n \times K_m$ are considered. A theoretical algebraic approach is also taken into account showing that an algebraic decomposition corresponds to the practical classification of shop problems..

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