A Parallel Algorithm for Solving the PFSP on the Grid

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Abstract : Solving NP-hard combinatorial optimization problems by exact search methods, such as Branch-and-Bound, may degenerate to complete enumeration. For that reason, exact approaches limit us to solve only small or moderate size problem instances, due to the exponential increase in CPU time when problem size increases. One of the most promising ways to reduce significantly the computational burden of sequential versions of Branch-and-Bound is to design parallel versions of these algorithms which employ several processors. This paper describes a parallel Branch-and-Bound algorithm called GALB for solving the classical permutation flowshop scheduling problem as well as its implementation on a Grid computing infrastructure. The experimental study of our distributed parallel algorithm gives promising results and shows clearly the benefit of the parallel paradigm to solve large-scale instances in moderate CPU time.