

# PARALLEL MACHINE SCHEDULING, LINEAR PROGRAMMING, AND PARAMETER LIST SCHEDULING HEURISTICS

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In this paper we consider a class of parallel machine scheduling problems and their associated set-partitioning formulations. We show that the tightness of the linear programming relaxation of these formulations is directly related to the performance of a class of heuristics called parameter list scheduling heuristics. This makes it possible to characterize the worst possible gap between optimal solutions for the scheduling problems and the corresponding linear programming relaxations. In the case of the classical parallel machine weighted completion time model we also show that the solution to the linear programming relaxation of the set-partitioning formulation is asymptotically optimal under mild assumptions on the distribution of job weights and processing times. Finally, we extend most of the results to the time-discretized formulation of machine scheduling problems.