Optimal online algorithms on two hierarchical machines with tightly-grouped processing times.


Summary: This paper considers an online hierarchical scheduling problem on two parallel identical machines. The objective is to minimize the makespan. It is assumed that all jobs have bounded processing times in between $p$ and $rp$, where $p > 0$ and $r \geq 1$. We first improve a previous result by giving an optimal online algorithm for the non-preemptive version. For the preemptive version, we present an optimal preemptive algorithm without introducing idle time for all $r \geq 1$. If the algorithm is allowed to use idle time, we show that the semi-online information that jobs are tightly-grouped cannot help improve the bound of the pure online problem.

Keywords: online scheduling; hierarchy; competitive ratio