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Online hierarchical scheduling on two machines with known total size of low-hierarchy jobs.

Summary: In this paper, we consider three versions of semi-online hierarchical scheduling problems on two identical machines, with the purpose of minimizing the makespan. In the first version, we assume that the total size of jobs with lower hierarchy is given and we get the tight bound $\frac{3}{2}$. In the second one, assume that the total size of jobs in each hierarchy is given and we get the tight bound $\frac{4}{3}$. In the third one, we assume that the total size of jobs with lower hierarchy is known in advance and a buffer of size $K$ is given to store at most $K$ jobs temporarily. We propose an optimal algorithm with competitive ratio $\frac{4}{3}$ using $K = 1$ and show that a bigger buffer size is not helpful.

Keywords: scheduling problem; semi-online; hierarchical constraint; competitive ratio
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