

In the majority of production scheduling studies, the objective is to minimise a criterion which is generally, function of completion times of production jobs. However, for some manufacturing systems, the reliability/availability of machines can be the most important performance criteria towards decision makers. In this paper, we deal with a production scheduling problem on identical parallel machines and the objective is to find the best assignment of jobs on machines maximising the system availability. We assume that the production system can be subject to potentially costly failures then PM actions are performed at the end of production jobs. We have proposed a branch and bound algorithm, dominance rules and an efficient upper bound to solve the proposed model optimally. Computational experiments are carried out on randomly generated test problems and results show the efficiency of the proposed upper bound and dominance rules. [Submitted 23 December 2016; Accepted 27 October 2018]