

The joint production scheduling and preventive maintenance problems have recently attracted researchers' attention given their contribution, both the production and the maintenance functions and their integration, to the firms' efficiency. In this paper, we deal with production scheduling and preventive maintenance (PM) planning on single machine problem. The aim is to find an appropriate sequencing of production jobs and a PM planning to minimize two objectives simultaneously: total tardiness of jobs and machine unavailability. We propose a bi-objective exact algorithm, that we called BOBB, based on bi-objective branch and bound method to find the efficient set. We introduced several properties and bound sets to enhance the performance of the proposed BOBB algorithm. Furthermore, we propose a hybrid method, that we called GA-BBB, based on genetic algorithm and binary branch and bound algorithm to compute an approximate efficient set to be used as an initial upper bound set in the BOBB algorithm. An experimental study was conducted to show the efficiency of the GA-BBB and the BOBB algorithms