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RELATION BETWEEN PRODUCTION CAPACITY AND VARIETY OF PRODUCTS ON A SCHEDULING WITH PERISHABLE ITEMS FOR MINIMIZING THE SUM OF EARLINESS AND TARDINESS

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Abstract. *This paper addresses a practical scheduling problem with perishable items as an example of food-processing industry, which has not been studied so far, and presents a scheduling method and some experimental results. This paper focuses on the problem of boiling process in a jam plant. The problem in this paper includes the constraint of perishability, which is a constraint when products are processed too much earlier than their due date, the values are going to reduce by reason of inferior quality, on the other hand, when the production is not in time for due date, the shortage of supply is going to happen. In the boiling process, setup time to change the kinds of products can be assumed as production bottleneck, so, it might be important to control setup operations for obtaining an effective management. To find a useful sequence to boil ingredients, a new management method is considered to minimize the deterioration in quality caused by the sum of earliness and tardiness. As basic study, this paper shows a general production line producing relatively small kinds of products in comparison with high-mix low-volume production line. In experiments, this paper mainly considers the possibility of variety of products corresponding to the production capacity.*
Keywords: Food-processing, Perishable, Scheduling, High-mix low-volume, Minimizing the sum of earliness and tardiness

1. **Introduction.** Over the last several years, practical scheduling problems have been studied by many researchers (Ma et al., 2010, Smith et al., 2009) including food-processing industry which is motivating our study. For example, Zhang and Wu presented a decomposition based algorithm for large-scale job shop scheduling problems, and numerical computations were conducted for real-life production environment of a speed-reducer factory (Zhang and Wu, 2009). Tseng et al. proposed a dynamic scheduling heuristic that utilized task deadline and task assignment time to enhance the completeness of the experiment and to more closely approach real Grid computing (Tseng et al., 2009).