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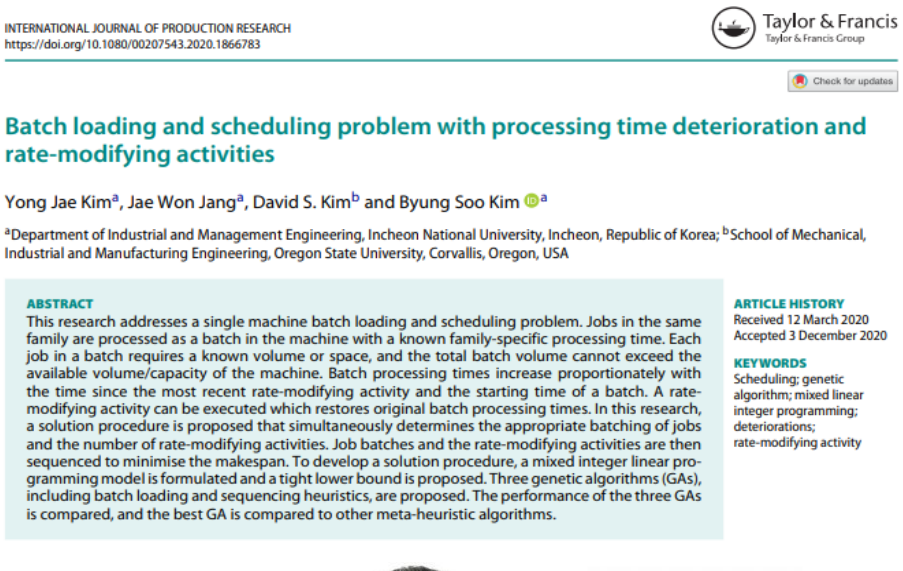
논문 제목 : "Batch loading and scheduling problem with processing time deterioration and rate-modifying activities"



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Batch loading and scheduling problem with processing time deterioration and rate-modifying activities

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ABSTRACT

This research addresses a single machine batch loading and scheduling problem. Jobs in the same family are processed as a batch in the machine with a known family-specific processing time. Each job in a batch requires a known volume or space, and the total batch volume cannot exceed the available volume/capacity of the machine. Batch processing times increase proportionately with the time since the most recent rate-modifying activity and the starting time of a batch. A rate-modifying activity can be executed which restores original batch processing times. In this research, a solution procedure is proposed that simultaneously determines the appropriate batching of jobs and the number of rate-modifying activities. Job batches and the rate-modifying activities are then sequenced to minimise the makespan. To develop a solution procedure, a mixed integer linear programming model is formulated and a tight lower bound is proposed. Three genetic algorithms (GAs), including batch loading and sequencing heuristics, are proposed. The performance of the three GAs is compared, and the best GA is compared to other meta-heuristic algorithms.

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Scheduling; genetic algorithm; mixed linear integer programming; deteriorations; rate-modifying activity

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인천대학교 산업경영공학과 생산혁신 연구실 **김병수(부교수) 연구 지도 하에 김용재(제1저자: 학부과정), 장재원(공동저자: 학부과정)**은 반도체 배치 생산 시 최적 배치로딩 및 일정계획에 관한 연구토픽으로 International Journal of Production Research 온라인판에 게재하였다. 해당 저널은 IF: 8.568 (2020)기준 Q1급 저널로 해당분야: Production and Manufacturing에서 TOP 저널에 속한다. 학생들은 학부2학년 후반기부터 인천대학교 공과대학 및 교육혁신원에서 지원하는 학부생 연구참여 프로그램인 EATED 및 교수-학생전공심화 연구모임 등에 참여하여 지도교수의 세부 전공에 관한 이해도를 높이고 학생들의 연구에 대한 흥미 및 경험을 쌓았다. 이후 지속적으로 국내학술대회 등에 참여하여 연구의 결과물들을 발표하고, 연구를 확장하여 최종 연구결과물을 성공적으로 도출하였다.