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An Energy-Efficient Multi-Objective Optimization for Flexible Job-Shop Scheduling Problem

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Highlights:

- Energy consumption model at shop floor level
- Scheduling of both production and maintenance operations
- A multi-objective model
- (i) Total completion time, (ii) Total availability of system, and (iii) Energy consumption objective functions
- Extensive analysis and results

Abstract. In recent years there has been increased concern on energy efficiency of industries. Since the scheduling problems in the shop floors are directly related to the energy consumption, an appropriate way to improve energy efficiency in industrial plants is to develop effective scheduling strategies. Hence, the aim of this paper is to design an energy-efficient scheduling in a shop floor industrial environment, i.e., flexible job-shop scheduling problem (FJSP). To this end, a multi-objective optimization model is developed with three objective functions: (i) minimizing total completion time, (ii) maximizing the total availability of the system, and (iii) minimizing total energy cost of both production and maintenance operations in the FJSP. To cope with this multi-