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HEURISTICS FOR NOISE-SAFE JOB-ROTATION PROBLEMS CONSIDERING LEARNING-FORGETTING AND BOREDOM-INDUCED JOB DISSATISFACTION EFFECTS

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Abstract

In mitigating occupational hazards, there is often a need to use administrative controls such as job rotation over a prolonged period until the hazards can be eliminated or mitigated to safe levels. This research develops a noise-safe job-rotation optimization model that accounts for learning, forgetting, and boredom effects. Our analysis focuses on the case of human-paced and labor-intensive operations, considering the trade-off between safety and productivity. A case of multi-skilled workers that have heterogeneous skill levels with varying problem sizes is used to demonstrate the model's capabilities. A genetic algorithm and a randomized greedy algorithm are developed and shown to be effective in solving large-scale safe job rotation problems. Our results also show how the boredom and forgetting effects create productivity delays when job rotation is used.

Keywords: heuristics, job rotation scheduling, job satisfaction, learning-forgetting, occupational hazards

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