1.0 List of abstracts

Hernán Chávez-García, Krystel K. Castillo-Villar,

1. Simulation-based model for the optimization of machining parameters in a metal-cutting operation,

Simulation Modelling Practice and Theory,

Volume 84,

2018,

Pages 204-221,

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https://doi.org/10.1016/j.simpat.2018.02.008.

(http://www.sciencedirect.com/science/article/pii/S1569190X18300200)

Abstract: To achieve a certain measurable performance in cutting machines, the machine parameters need to be optimized. Several constraints determine the possible values that these parameters can take. Although parameters are usually assumed to be deterministic, in practice, it is common to find variations on the characteristics of the products or the processes. Modeling machining parameters as stochastic factors provides a more realistic representation of cutting operations. Moreover, multiple operational objectives are of interest, in many real situations, these multiple objectives are conflicting. Consequently, the problem of setting the parameters becomes a trade-off situation. This paper presents a novel Simulation-based Multi-Objective Optimization (SimMOpt) solution procedure. The procedure is divided into two phases: (1) finding initial solutions and, (2) using a simulated annealing-based method for finding neighboring solutions. In the first phase, non-linear goal programming is used for finding high quality initial solutions. The second phase incorporates Pareto Archive Evolution Strategy (PAES) and hypotheses testing for searching near-optimal solutions for a set of stochastic parameters (i.e., cutting speed, feed rate, and depth of cut) in metal cutting operations. Three objectives are optimized (i.e., operation time, operation cost, and quality of the product). The results from implementing this procedure are analyzed and compared to a baseline methodology based on the Multi-Objective Simulated Annealing (MOSA) algorithm. The analysis demonstrates that the proposed method outperforms the Genetic Algorithm (GA), which was the benchmark algorithm, in terms of the solution quality of all the objectives. More importantly, the solutions from using the SimMOpt procedure outperform those obtained from using an enhanced MOSA-based approach (i.e., 4.71% improvement in the hypervolume approximation).

Keywords: Stochastic multi-objective optimization; Machining parameters; Simulated annealing; Manufacturing

Yichao He, Xizhao Wang,

2. Group Theory-Based Optimization Algorithm for Solving Knapsack Problems,

Knowledge-Based Systems,

3. Hybrid Genetic Bees Algorithm applied to single machine scheduling with earliness and tardiness penalties,

Computers & Industrial Engineering,

Volume 113,

2017,

Pages 842-858,

ISSN 0360-8352,

https://doi.org/10.1016/j.cie.2017.07.018.

(http://www.sciencedirect.com/science/article/pii/S0360835217303200)

Abstract: This paper presents a hybrid Genetic-Bees Algorithm based optimised solution for the single machine scheduling problem. The enhancement of the Bees Algorithm (BA) is conducted using the Genetic Algorithm's (GA's) operators during the global search stage. The proposed enhancement aims to increase the global search capability of the BA gradually with new additions. Although the BA has very successful implementations on various type of optimisation problems, it has found that the algorithm suffers from weak global search ability which increases the computational complexities on NP-hard type optimisation problems e.g. combinatorial/permutational type optimisation problems. This weakness occurs due to using a simple global random search operation during the search process. To reinforce the global search process in the BA, the proposed enhancement is utilised to increase exploration capability by expanding the number of fittest solutions through the genetical variations of promising solutions. The hybridisation process is realised by including two strategies into the basic BA, named as "reinforced global search" and "jumping function" strategies. The reinforced global search strategy is the first stage of the hybridisation process and contains the mutation operator of the GA. The second strategy, jumping function strategy, consists of four GA operators as single point crossover, multipoint crossover, mutation and randomisation. To demonstrate the strength of the proposed solution, several experiments were carried out on 280 well-known single machine benchmark instances, and the results are presented by comparing to other well-known heuristic algorithms. According to the experiments, the proposed enhancements provides better capability to basic BA to jump from local minima, and GBA performed better compared to BA in terms of convergence and the quality of results. The convergence time reduced about 60% with about 30% better results for highly constrained jobs.

Keywords: Swarm-based optimisation; Bees Algorithm (BA); Genetic Bees Algorithm (GBA); Single Machine Scheduling Problem (SMSP)

Michael Sharp, Ronay Ak, Thomas Hedberg,

CIRP Journal of Manufacturing Science and Technology,

Volume 21,

2018,

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https://doi.org/10.1016/j.cirpj.2018.03.003.

(http://www.sciencedirect.com/science/article/pii/S1755581718300129)

Abstract: A new emerging frontier in the evolution of the digitalisation and the 4th industrial revolution (Industry 4.0) is considered to be that of “Biologicalisation in Manufacturing”. This has been defined by the authors to be “The use and integration of biological and bio-inspired principles, materials, functions, structures and resources for intelligent and sustainable manufacturing technologies and systems with the aim of achieving their full potential.” In this White Paper, detailed consideration is given to the meaning and implications of “Biologicalisation” from the perspective of the design, function and operation of products, manufacturing processes, manufacturing systems, supply chains and organisations. The drivers and influencing factors are also reviewed in detail and in the context of significant developments in materials science and engineering. The paper attempts to test the hypothesis of this topic as a breaking new frontier and to provide a vision for the development of manufacturing science and technology from the perspective of incorporating inspiration from biological systems. Seven recommendations are delivered aimed at policy makers, at funding agencies, at the manufacturing research community and at those industries involved in the development of next generation manufacturing technologies and systems. It is concluded that it is valid to argue that Biologicalisation in Manufacturing truly represents a new and breaking frontier of digitalisation and Industry 4.0 and that the market potential is very strong. It is evident that extensive research and development is required in order to maximise on the benefits of a biological transformation.

Keywords: Industrie 4.0; Manufacturing; Biologicalisation in Manufacturing; Biological transformation; International perspective; Cyber-physical systems; Industry 4.0; Digitalisation; Bio-inspired; Bio-intelligent; Bio-integrated

Prudhvi Reddy Gutta, Varun Sai Chinthala, Raja Venkatesh Manchoju, Viswa Charan MVN, Rajesh Purohit,

22. Order Release for Temporary Paced Sequences in Flexible High Throughput Systems,

Procedia CIRP,

Volume 72,

2018,

Pages 689-694,

ISSN 2212-8271,

https://doi.org/10.1016/j.procir.2018.03.088.

(http://www.sciencedirect.com/science/article/pii/S2212827118301926)

Abstract: Material testing in high-throughput systems facilitates a fast, precise and innovative method for the identification of metals with required characteristics. This material testing setup leads to highly flexible material flow between test stations similar to job shop fabrication. Various requirement specific test plans and the occurrence of temporarily paced sequences between subsequent processes amplify the necessity of controlling the material flow to reduce idle times and increase utilization. This paper introduces a concept of controlling temporarily paced sections in highly flexible systems, which improves the productivity of the entire system.

Keywords: Scheduling; Process Control; High-Throughput

Michael P. Brundage, William Z. Bernstein, Steven Hoffenson, Qing Chang, Hidetaka Nishi, Timothy Kliks, K.C. Morris,

23. Analyzing environmental sustainability methods for use earlier in the product lifecycle,

Journal of Cleaner Production,

Volume 187,

2018,

Pages 877-892,

ISSN 0959-6526,

https://doi.org/10.1016/j.jclepro.2018.03.187.

(http://www.sciencedirect.com/science/article/pii/S0959652618308588)

Abstract: Environmental sustainability information in the manufacturing industry is not easily shared between stages in the product lifecycle. In particular, reliable manufacturing-related information for assessing the sustainability of a product is often unavailable at the design stage. Instead, designers rely on aggregated, often outdated information or make decisions by analogy (e.g., a similar manufacturing process for a similar product yielded X and Y results). However, smart manufacturing and the Internet of Things have potential to bridge the gap between design and manufacturing through data and knowledge sharing. This paper analyzes environmental sustainability assessment methods to enable more accurate decisions earlier in design. The techniques and methods are categorized based on the stage they apply to in the product lifecycle, as described by the Systems Integration of Manufacturing Applications (SIMA) reference architecture. Furthermore, opportunities

for aligning standard data representation to promote sustainability assessment during design are identified.

Keywords: Sustainable design; Sustainable manufacturing; Environmental assessment; Analysis tools; Lifecycle assessment; Smart manufacturing

M. Abbas, H. ElMaraghy,

24. Synthesis and optimization of manufacturing systems configuration using co-platforming,

CIRP Journal of Manufacturing Science and Technology,

Volume 20,

2018,

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https://doi.org/10.1016/j.cirpj.2017.09.006.

(http://www.sciencedirect.com/science/article/pii/S1755581717300482)

Abstract: A mathematical mixed integer linear programming momdel to synthesize the manufacturing system configuration based on co-platforming strategy by mapping product platform to a corresponding machines platform is introduced. The mathematical model is verified through mathematical example and implemented in case study from automotive cylinder block manufacturer. The proposed model is beneficial in synthesizing manufacturing system to reduce investment costs by maintaining a group of platform machines that do not change with the change in product variants in different production periods. The synthesized manufacturing system platform does not change with the introduction of new product variants with new features belonging to the same product family which supports economic sustainability of manufacturing systems.

Keywords: Manufacturing system; Configuration; Synthesis; Product platform; System platform; Co-platforming

Dujuan Wang, Yunqiang Yin, T.C.E. Cheng,

24. Parallel-machine rescheduling with job unavailability and rejection,

Omega,

2018,

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ISSN 0305-0483,

https://doi.org/10.1016/j.omega.2018.04.008.

(http://www.sciencedirect.com/science/article/pii/S0305048317301950)

Applied Energy,

Volume 204,

2017,

Pages 544-559,

ISSN 0306-2619,

https://doi.org/10.1016/j.apenergy.2017.07.076.

(http://www.sciencedirect.com/science/article/pii/S0306261917309509)

Abstract: The vehicle fuel economy standards have been implemented worldwide. However, it is quite difficult for the automakers to secure an optimal portfolio of fuel-efficient technologies which complies with these strengthened standards and minimizes the overall cost at the same time. In this paper, a genetic-algorithm-based heuristic method is proposed for technological strategy planning. In particular, a case study of the Corporate Average Fuel Economy standards in China is presented. Moreover, the mathematical model is constructed with the considerations of the technology cost, effect of reducing fuel consumption and technology physical weight. Problem complexity is analyzed and proven NP-hard. Moreover, a comparison analysis of performance is carried out between the elaborated genetic algorithm and the greedy algorithm that is currently used by most automakers to determine the technological strategies in China. The results imply that genetic algorithm outperforms the common method because it provides more economical and reasonable strategies. In addition, the incremental cost under the greedy algorithm is 16.4% higher than that under genetic algorithm. Due to the counteractive effect under the weight-based standards in China, the mass reduction technologies should be given lower priorities compared with current strategies. To satisfy the standards by 2020, automakers should implement more conventional engine and transmission technologies instead of the hybrid electric vehicle technologies. It is recommended that automakers should develop heuristic algorithms to make strategic decisions more reasonably.

Keywords: Fuel economy regulation; Technology strategy; Genetic algorithm; Complexity analysis; Corporate Average Fuel Consumption

Gustavo Silva Paiva, Marco Antonio M. Carvalho,

39. Improved heuristic algorithms for the Job Sequencing and Tool Switching Problem,

Computers & Operations Research,

Volume 88,

2017,

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(http://www.sciencedirect.com/science/article/pii/S0305054817301971)

the reliability of machinery in job shop production systems, where materials, parts, and other production needs are handled by automated guided vehicles (AGV). The failures time of the parallel machines in a given shop follow either an exponential or a Weibull distribution. As there is no closed-form equation to calculate the reliability of the shop in the Weibull case, a simulation approach is taken in this paper to estimate the reliability. Then, a bi-objective nonlinear optimization model is developed for the problem under investigation to maximize shop reliability as well as to minimize production time, simultaneously. In order to assess the efficacy of the proposed model, some random instances are generated, based on which two meta-heuristic algorithms called non-dominated sorting cuckoo search (NSCS) and multi-objective teaching–learning-based optimization (MOTLBO) are designed. Finally, to evaluate and compare the effectiveness of the proposed solution algorithms, an efficient solution AHP-TOPSIS technique is utilized.

Keywords: Flexible manufacturing systems; Automated guided vehicle; Nonlinear optimization; NSCS; MOTLBO; AHP-TOPSIS

Wojciech Bożejko, Andrzej Gnatowski, Jarosław Pempera, Mieczysław Wodecki,

43. Parallel tabu search for the cyclic job shop scheduling problem,

Computers & Industrial Engineering,

Volume 113,

2017,

Pages 512-524,

ISSN 0360-8352,

https://doi.org/10.1016/j.cie.2017.09.042.

(http://www.sciencedirect.com/science/article/pii/S036083521730459X)

Abstract: In this paper, we consider a cyclic job shop problem, consisting of production of a certain set of elements at fixed intervals. Optimization of the process is reduced to a minimization of a cycle time, i.e. the time, after which the next batch of the same elements may be produced. We introduce a new parallel method for the cost function calculation. The parallelization is not trivial and cannot be done automatically by the existing compilers due to the recurrent character of formulas. Since the problem is strongly NP-hard, a heuristic algorithm was designed to solve it. Computational experiments were done in a multiprocessor environment, namely – in Intel Xeon Phi.

Keywords: Job shop problem; Cyclic scheduling; Tabu search; Parallel algorithm

Sumin Kang, Minhee Kim, Junjae Chae,

44. A closed loop based facility layout design using a cuckoo search algorithm,

Expert Systems with Applications,

Volume 93,

2018,

Disclaimer

This note is taken for my research purpose

I have list down the key points for Genetic Algorithms for FMS

The writeups are taken from abstracts mention in the list of abstracts

You may find and read the full text there.

Yours sincerely

-Maizi-