

IDENTIFYING POTENTIAL BOTTLENECKS THROUGH ACTIVITY UNDER-UTILIZATION COST

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Abstract

Due to the increased emphasis on technology, modern manufacturing processes are no longer labor intensive. Therefore, the traditional cost estimation approaches based on volumetric measures are inadequate to assess the costs accurately. Contemporary approaches such as activity based costing have been suggested that track hidden costs by relating them to the specific activities, thus providing a much more realistic estimation for manufacturing costs. Since activity based costing does not assign cost of under-utilized resources to customers, the issue of resource under-utilization remains unaddressed. The present paper recognizes resource under-utilization cost to be an important consideration in order to identify the potential bottlenecks in the manufacturing process. This paper proposes an activity based costing model to identify resource under-utilization assuming normally distributed demand. In light of futuristic uncertainty about order sizes and in order to validate the proposed model, a discrete-event simulation approach has been presented. 44 refs.

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Key Words: *Simulation, Manufacturing Costs, Resource Under-Utilization, ABC Costing*

SIMULATION OF PRODUCTION LINES – THE IMPORTANCE OF BREAKDOWN STATISTICS AND THE EFFECT OF MACHINE POSITION

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Abstract

This paper demonstrates the importance of choosing the correct values and statistical distributions for breakdown frequency and duration when simulating production line productivity. Statistical distributions with a wide range tend to reduce the productivity of the line but this trend can be disrupted by poor choice of mean values for the variables in question. Also, it is demonstrated that the productivity of a production line can be improved simply by re-arranging the order of unreliable machines in the line. If the line consists of similar or exchangeable machines, productivity can be improved if the most unreliable machines are placed towards the end of the line. The paper also demonstrates the risks of reduction of the standard deviation to obtain a more deterministic model. 10 refs.

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Key Words: *Simulation, Manufacturing, Breakdown, Statistic Distribution, Scrapping*

SYMMETRY BREAKING PHENOMENA OF PURELY VISCOUS SHEAR-THINNING FLUID FLOW IN A LOCALLY CONSTRICTED CHANNEL

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Abstract

The goal of a present study is to investigate the effects of generalized Newtonian fluids on the threshold of the transition from flow symmetry to its asymmetry for the flow through a locally constricted channel. We consider purely viscous shear-thinning fluid and compare it with the Newtonian fluid. Fluid flow is studied numerically by solving the two dimensional momentum equations along with the continuity equation and the Carreau-Yasuda rheological model. We report systematic results in a range of generalized Reynolds number $150 \leq Re \leq 250$ with a focus on its critical value. Results indicate that the shear-thinning viscous behaviour decreases the onset of bifurcation phenomena and the critical value of Reynolds number. Last but not least, a systematic grid refinement analysis and numerical accuracy study is performed and present numerical results may be treated as the benchmark. 16 refs.

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Key Words: *Bifurcation, Inelastic Shear-Thinning Fluid, Carreau-Yasuda Model, Numerical Modelling*

PART-MACHINE GROUP FORMATION WITH OPERATION SEQUENCE, TIME AND PRODUCTION VOLUME

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Abstract

This work presents an algorithm for design of cellular manufacturing system. It includes important production data such as Operation sequence, operation time, production volume & Intercellular travel loss. Adapted design activity organizing model & image representation model in computer vision is used to incorporate production data into model. Machine sequence Part Load Volume Matrix is formed. Orthographic view part grouping analysis is used for part family formation. Machines are allocated on basis of their utilization for a part family. A new performance measure is proposed considering effect of occupied elements, void, and exceptional elements. The performance of algorithm is examined and compared with existing methods in its class. The result show performance of proposed algorithm is comparable & of good quality with existing methods. Proposed algorithm has immense industrial application. It can be implemented by using free software, Scilab. It can also be implemented by use of commercial softwares. 23 refs.

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Key Words: *Cellular Manufacturing, Part Families and Machine Cells, Algorithm*