Proceedings of the 2015 International Conference on Operations Excellence and Service Engineering
Orlando, Florida, USA, September 10-11, 2015

Variety Impact Sources on the Inducible Manufacturing Complexity of the Flexible Automated Lines

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Abstract

This paper describes sources of the variety and presents mathematically a novel perspective that can be used to model set of vehicle models (VMs). Set variation has considered is the impact source inducing automated system complexity; moreover, it can measure feasibly the performance of a flexible automotive system (FAS). An analytical modeling process has been applied considering a sequenced set size (SSS) of the VM variety as a function changing relative to the time. The processing time (PT) has analytically represented as discrete events of time period and logically considered as an inherent reason for ranking the stand of VMs into the SSS. Changing the desired PT for both VM and SS respect to deterministic values during the static phase of planning has measurably expressed the variability of the inducible system complexity. A mathematical integer programming and infinite series have proposed to simulate the control process of the variety and investigate the optimal solutions. The contribution of this research work is to introduce a new depiction of the production variety with the flexible automated environments that can be used for mathematical modeling the system performance and impacts the complexity.

Biographies

Hayder Zghair is a Faculty member in the Department of Automated Manufacturing Engineering at University of Baghdad, Baghdad, Iraq. Mr. Zghair earned B.Sc. in Production Engineering from University of Technology, Baghdad, M.Sc. in Production Engineering from University of Technology, Baghdad, and Master in Manufacturing Systems Engineering from Lawrence Technological University, Michigan, USA. Currently, Mr. Zghair is a PhD candidate in Manufacturing Systems Engineering at Lawrence Technological University, Michigan, USA. He has published journal and conference papers. Mr. Zghair has completed E-Learning project with UNISCO. His research interests include Flexible Automated Manufacturing, Robotics, Analytical Modeling & Simulation, and Optimization. He is member of IEOM & IEU. Recently, he has joined to Kettering University, Michigan, USA as an instructor at Industrial and Manufacturing Engineering Department.

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