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Pages 89-100

OPTIMIZATION OF PRODUCT TRANSFER WITH CONSTRAINT IN ROBOTIC CELL USING SIMULATION

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Abstract
This article deals with simulation modelling of a flexible manufacturing cell. Our purpose is the optimization of a robot cycle that transfers products in the cell. We consider the productivity as performance criterion. An analytical survey is developed and validated by simulation results. These results permit to get an aided adequate decision and a large reactivity facing the changes of products operated in a flexible manufacturing cell. A constraint of flow time of products on machines has been considered in the model, the results of the simulation allowed to eliminate invalid cycles with this constraint and to classify the remaining cycles according to their shortest cycle times. 9 refs.
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Key Words: *Robotic Cell, Cycle, Optimization, Simulation, Constraint*

Pages 101-113

PERFORMANCE MODELING OF FMS WITH FLEXIBLE PROCESS PLANS - A PETRI NET APPROACH

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Abstract
This paper presents modeling and performance analysis of FMS when flexible process plans for each part type are available using Petri nets (PN) modeling approach. PN have been applied successfully for modeling of discrete event dynamic systems such as FMS that are characterized by conflicts, concurrency, synchronization and deadlocks. An example FMS consisting of four machines with individual input and output buffer has been taken into consideration and its PN model construction is explained. System performance is evaluated in two manufacturing environments (i.e. virtual batch manufacturing and virtual line manufacturing). The analysis will assist the planner in selecting optimum set of operating parameters (such as dispatching rule, number of pallets released to the system etc.) for a given production order to achieve the desired performance measure. Several performance measures such as makespan, mean flow time, maximum flow time and variance of flow time have been used to evaluate system performance. 29 refs.
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Key Words: *Petri Nets, Simulation, Modelling, FMS, Flexible Process Plans*

Pages 114-125

SOFTWARE FOR MODELLING AND SIMULATION OF A REMOTELY-OPERATED VEHICLE (ROV)

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Abstract
This paper considers the dynamic modelling and simulation of an underactuated Remotely Operated Vehicle (ROV) designed by Robotic Research Centre (RRC), in Nanyang Technological University (NTU) using a ROV Design and Analysis (RDA) toolbox written in MATLAB/SIMULINK™. The proposed RDA provides a means to simulate the mathematical models of ROV and the control system design before planning for final hardware implementation. This is especially useful, as the ROV model is highly uncertain due to the hydrodynamic forces that are nonlinear and coupled. However, there is no commercial software for ROV control system design and analysis. 16 refs.
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Key Words: *Remotely Operated Vehicle, Modelling, Simulation, MATLAB/SIMULINK™*