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CONCURRENTLY PART-MACHINE GROUPS FORMATION WITH IMPORTANT PRODUCTION DATA

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Abstract
This work presents an algorithm for design of cellular manufacturing system. It considers sequence of operation for every component as ordinal level data. The ratio level data includes operation time per unit, production volume and machine capacity. A matrix model is developed to incorporate ordinal level data and ratio level data. Model is then standardized. From this, Part – Part correlation model is formed. This is undergone through principle component analysis. Now, Feature-Vector and New Standardized Sequence Part Load matrices are formed. These are used for grouping purpose. Part-machine orthographic view is used for concurrent part-machine family formation. Performance of algorithm is comparable and of good quality with existing methods in its class. To facilitate industrial application, it can be implemented by using free software, Scilab and/or commercial softwares. 40 refs.
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Key Words: *Cellular Manufacturing, Part-Machine Families, Algorithm*

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FINITE ELEMENT ANALYSIS OF SUPERPLASTIC BLOW-FORMING OF TI-6AL-4V SHEET INTO CLOSED ELLIP-CYLINDRICAL DIE

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Abstract
Utilizing commercial DEFORM^{TM} 3D finite element (FE) software, this study performs a series of numerical simulations to investigate the superplastic blow-forming of Ti-6Al-4V titanium alloy into a closed ellip-cylindrical die. In performing the simulations, it is assumed that the die is a rigid body and the titanium alloy sheet is a rigid-plastic material with homogeneous and isotropic properties. The simulations focus specifically on the respective effects of the shear friction factor, the die entry radius, the die height and the die's short-axis length on the thickness, effective stress, effective strain and critical damage distributions within the blow-formed product. Overall, the simulation results confirm the suitability of the DEFORM^{TM} 3D software for modelling the superplastic blow-forming of Ti-6Al-4V titanium alloy. 20 refs.
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Key Words: *Finite Element Analysis, Superplastic Blow-Forming, Titanium Alloy, Ellip-Cylindrical Die*

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TASK SCHEDULING OF AGV IN FMS USING NON-TRADITIONAL OPTIMIZATION TECHNIQUES

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Abstract
Flexible Manufacturing System (FMS), which is equipped with several CNC machines and Automated Guided Vehicle (AGV) based material handling system is designed and implemented to gain the flexibility and efficiency of production. After the implementation of FMS, in practice, the scheduling of the resources, such as frequent variation in the parts, tools, AGV routings, becomes a complex task. This is being done traditionally using various mathematical programming techniques. In recent years, random search algorithms have been attempted for scheduling. Most of the research has been emphasized only on single objective optimization. Multi objective problems in scheduling with conflicting objectives are more complex and combinatorial in nature and hardly have a unique solution. This paper addresses multi objective task scheduling of AGV in a flexible manufacturing environment using non- traditional optimization algorithms. In this paper the authors made an attempt to find the near-optimum schedule for two AGVs based on the balanced workload and the minimum traveling time for maximum utilization. The proposed methods are exemplified with illustrations. 34 refs.
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Key Words: *Flexible Manufacturing System, AGV, Task Scheduling, Genetic Algorithm, Ant Colony Optimization Algorithm*

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A TWO-STEP TRANSSHIPMENT MODEL WITH FUZZY DEMANDS AND SERVICE LEVEL CONSTRAINTS

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Abstract
We consider a distribution network composed of one supplier and several non-identical locations characterized by fuzzy customer demands and service level constraints. These locations could cooperate together via product transfer known as transshipment. The transshipment problem consists in determining the replenishment quantities that minimize the total inventory cost where a specific transfer policy is practiced. Our objectives in this paper are to identify an inter-location transfer policy that participates to satisfy the service level constraints and to determine the approximate replenishment quantities. To achieve these objectives we propose: (1) a new transshipment model based on the chance constrained programming, (2) a two-step transshipment policy that differs from classic ones by product transfer from locations in need to others also in need and (3) a hybrid algorithm based on fuzzy simulation and genetic algorithms to approximate replenishment quantities. 29 refs.
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Key Words: *Transshipment Problem, Service Level Constraints, Fuzzy Customer Demands, Fuzzy Simulation, Genetic Algorithm*