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FAULT ANALYSIS OF MANUFACTURING SYSTEMS AS ADDITIONAL CONSTRAINT BY SIMULATION

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Abstract
Increased competition in many industries has resulted in greater emphasis on automation to improve productivity and quality. Since automated systems are more complex, they typically can only be analyzed by simulation. Improvements in simulation software (e.g., graphical user interfaces) have reduced model-development time, thereby allowing for more timely manufacturing analyses. The first results are showing that mentioned systems are suitable for the solving the manufacturing tasks. As was demonstrated, business process engineering is not limited to changes aiming at the renewal of the functional structure of the process, but it is also applicable to the decision and organization structure of the process. New approach, where system performance and reliability are estimated is introduced. 7 refs.

Key Words: *Functional Model, Data Model, Computer Simulation, Fault Tree Analysis, Entity Parameters Sensitivity*

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A MULTISENSOR-BASED NAVIGATION SYSTEM FOR MOBILE ROBOTS

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Abstract
This paper describes a multisensor-based navigation system for mobile robots. In navigation system, it is important to avoid collision. Because most of environmental sensors for collision avoidance have poor performance when they are used alone, the authors fused information obtained simultaneously with a scanning laser range finder, eight ultrasonic sensors, four CCD cameras, a laser fiber gyro, etc. and improved the reliability in environment recognition. The scanning laser range finder and ultrasonic sensors were newly designed and fabricated by the authors. Two of four CCD cameras were used for short-range detection and the other two were used for long-range detection, and they catch stereo images. Basic experiments were carried out and useful results were obtained. 6 refs.

Key Words: *Mobile robot, Autonomous Land Vehicle, Sensor-fusion, Navigation, Scanning Laser Range Finder, Ultrasonic Sensor*

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TOLERANCE ALLOCATION WITH ALTERNATIVE MANUFACTURING PROCESSES – SUITABILITY OF GENETIC ALGORITHM

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Abstract
Tolerance allocation plays an important role in product design and development process. The impact of tolerance specification on manufacturing cost has led to the development of several algorithms for tolerance allocation making use of various optimization techniques. Efforts have been made to obtain an economical set of tolerances associated with the manufactured dimensions, meeting the product functional requirements. Advancements in the classical tolerance allocation problem considering various aspects encountered in the real world assemblies have also been attempted. The focus of this research is on the advanced tolerance allocation problem involving simultaneous selection of manufacturing processes (machines) from amongst the alternatives for producing a toleranced feature. Here the solution surface is likely to be a multi-modal function involving several local minima. *Genetic algorithm*, a nontraditional approach, capable of dealing effectively with such cases, has been proposed for solution. The proposed methodology is very simple & straightforward, and automatically takes care of process selection constraints. The effectiveness of the new methodology has been demonstrated with the help of a few example case studies. Results obtained using this approach have been found in close comparison with those obtained in closed form using *exhaustive search* method based on the Lagrange's multiplier, the most reliable method for obtaining globally optimal solution. 40 refs.

Key Words: *Tolerance Allocation, Genetic Algorithms, Simultaneous Process (Machine) Selection, Process Selection Variables*

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SIMULATION BASED OWAS ANALYSIS OF WORK POSTURES IN THE ASSEMBLY INDUSTRY

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Abstract
The paper presents an ergonomically designed workplace for assembly using the simulation based OWAS method. Different analysis observations of body positions were carried out at an assembly workplace in a Slovenian medium – sized company. Typical for assembly workplaces are dynamical physical loadings which demand extensive treatment. For this reason the use of computer simulation at the planning stage is particularly favourable. Computer analysis can replace complicated and cost intensive tests for fitting up workplaces. With ergonomically optimised workplaces in the planning stage we can avoid a time consuming optimisation process during initial operation stage of manufacturing and related costs needed for additional changes. 8 refs.

Key Words: *Workplace Design, OWAS Method, Simulation, Assembly Industry*

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SIMULATION MODEL AND ANALYSIS OF THE STEAM TURBINE SUBSYSTEM

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Abstract
A simulation model of the steam turbine subsystem of TE-TO Zagreb thermal power plant has been developed. The facility supplies hot water to the town district heating, a steam to the industry and electrical energy. The steam turbine subsystem has been isolated for modeling and analysis because of the intrinsic impact on production efficiency. The new approach using a normalisation method has been used for a simulation model development. Results of analysis show a strong correlation between input variables and goal function enabling thus disturbance detection and partial compensation. 7 refs.

Key Words: *Steam Turbine, Normalisation, Simulation, Modelling, Disturbance*