TARDINESS BASED NEW DISPATCHING RULES FOR SHOP SCHEDULING WITH UNRELIABLE MACHINES

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Abstract

In this research paper a comparative study has been made of tardiness based existing as well as new dispatching rules. Mean tardiness, maximum tardiness and the number of tardy jobs objectives have been used to evaluate the performance of each dispatching rule. Several experimental parameters related to shop loading levels, breakdown levels and mean time to repair are taken into consideration to analyse the effect of these parameters on the performance of the various dispatching rules. Simulation results indicate that shop loading, breakdown level and mean time to repair are important parameters for the selection of an appropriate rule in a shop. 22 refs.

Key Words: *Tardiness, Dispatching Rules, Busy Time Approach, Inter Breakdown Time, Repair Time*

KINEMATICS AND FORCES IN THE ABOVE-KNEE PROSTHESIS DURING THE STAIR CLIMBING

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Abstract

The most modern generation of controlled AK prostheses is considered as important step forward in technology of manufacture of AK prostheses, since they offer the highest proximity to human walk. However, so far the problem of climbing the stairs by transfemoral amputee has not been resolved. The reason for unresolved problem of upstairs movement of persons with AK prosthesis lies in a need to introduce an external source of energy, which would provide the user with energy required for lifting a body when climbing the stairs.
The kinematic analysis of movement of the AK prosthesis with a build-in hydraulic cylinder connected to an external source of power is intended to prove that there is a real possibility for a person with an AK prosthesis to climb stairs. An analysis was carried out of the prosthesis movement in a sagital plane for the period of climbing from the first contact of the artificial foot with the step of a stair until the moment of its separation. Trajectories of characteristic points on the prosthesis were recorded for the examinee climbing three staircases with different gradients: shallow SH (25º), moderate M (30º) and steep ST (36º). The reaction force on stair during the movement of an AK prosthesis is analyzed. For more detailed analysis of climbing of a transfemoral amputee, an analysis of reaction force of stair for healthy persons has been carried out. The ELITE system with two CCD cameras and a Kistler platform for measuring the force on the surface were used during measurements. 17 refs.

Key Words: *Above-Knee Prosthesis, Hydraulic Cylinder, Stair Climbing*

ERGONOMICALLY DESIGNED WORKSTATION BASED ON SIMULATION OF WORKER'S MOVEMENTS

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Abstract

An ergonomics approach to the design of an industrial workstation attempts to achieve an appropriate balance between worker's capabilities and work requirements to optimize workers' productivity and the total system, as well as provide workers' physical and mental well-being, job satisfaction and safety. Over the years many theories, principles, methods and data relevant to the workstation design have been generated through research in ergonomics. Much of this knowledge is integrated in the software computer package ERGOPlan. The paper presents an optimal ergonomically and economically designed workstation of a cutter which was built with the use of two ERGO modules, ERGOMas (workstation design) and ERGOMan (simulation of workers' movements). To incorporate economic aspect of the workstation design, we parametrically described the key dimensions of the workstation. This action enabled optimal workstation design with consideration of both aspects. 30 refs.

Key Words: *Workstation Design, Ergonomics, Simulation, Static and Dynamic Analysis*

DYNAMIC RESPONSE SIMULATION OF PLANETARY GEARS BY THE ITERATIVE SPECTRAL METHOD

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Abstract

A planetary gear is modeled in this work. The equations of motion and the eigenfrequencies are recovered. The computation of the dynamic response is made using the spectral iterative method. The procedure is based on a modal approach with developments in the frequency domain. This technique has been successfully used and its convergence was quickly reached. Good agreement was obtained compared with the standard Newmark method. The dynamic response of the planetary gear is given directly in the frequency domain. The inverse Fourier transform gives the time response of the system. 10 refs.

Key Words : *Planetary Gear, Spectral Method, Dynamic Response Simulation*