

**MOBILE APPLICATION AS AN INNOVATIVE SUPPLY CHAIN CONCEPT AND THE
IMPACT OF SOCIAL CAPITAL**

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Abstract

EU textile industry with its inability to compete with mass-produced and less expensive imported items, mono-perspective business processes, no solutions for trustful interorganisational collaboration and hardly integration of end-customer in design and production processes conflict trends of technological developments, the rise of individual customer requirements and the success of innovative, flexible and heterarchical environments.

Offering a web-based product-centric collaboration space for dynamic and flexible information exchange between multiple companies including the end-customer can provide a new dimension of efficiency. For the establishment and effective functioning of such environment referred as virtual factory, intense communication and spontaneous sociability are clearly required and are affected by the connecting element that in modern social sciences – in the context of economic efficiency – is referred to as social capital. With this paper the virtual factory simulation shows the possible development of mobile applications for supply chain management, while promoting and using social capital in a decentralised production process oriented to innovative, custom-made products for the textile industry in Slovenia. 24 refs.

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Key Words: *Social Capital, Virtual Factory, Supply Chain, End-User Integration, Order Course Simulation*

**IMPLEMENTATION OF DEVS BASED DISTRIBUTED NETWORK SIMULATOR FOR
LARGE-SCALE NETWORKS**

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Abstract

In this study, a tool was developed for design and implementation of a new discrete event based distributed simulation for large-scale networks. By using DEVS as a modelling approach, client / server based, scalable, platform-independent, flexible new network modelling and simulation tool called ‘D-DEVSNET’ was designed and performance analysis were conducted. In order to show the performance of the network simulation tool, D-DEVSNET and the power of the DEVS approach on parallel and distributed applications, some tests were carried out such as the measurement of throughput capability of different sized networks in a certain period of time, the average end-to-end packet delay and the amount of packet loss, consumption of speed and memory. According to the tests that were conducted, D-DEVSNET has been proven a well-scalable and high performing simulation tool. 28 refs.

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Key Words: *Distributed Network Simulator, Client / Server Architecture, Large-Scale Network, Simulation Tools, DEVS, D-DEVSNET*

THE INFLUENCE OF THE INPUT PARAMETERS SELECTION ON THE RANSAC RESULTS

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Abstract

The RANSAC (RANDOM SAMPLING and CONSENSUS) enables us to search within a given group of points for subgroups of points that belong to a mathematically describable object or a part of an object. The number of iterations within a single repetition depends on the data, selection and settings of the input parameters (percentage of inliers, probability and minimum number of points that uniquely define a geometrical shape). In our research we applied simulation modelling to analyse the influence of the selection of input parameters on the approximation of the sphere and plane models. 25 refs.

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Key Words: *RANSAC, Simulation, Input Parameters, Plane Model, Sphere Model*

EVALUATION OF TWIST SPRINGBACK PREDICTION AFTER AN AHSS FORMING PROCESS

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Abstract

The springback of a sheet metal part is the change of its shape after removing a forming tool. An accurate prediction of springback is very difficult because sheet metal undergoes a complicated deformation process during the forming process. These are the following types of springback when considering the geometry of the product and the forming regime: angular change, sidewall curl, and twist. The latter is the key issue of this paper. A new definition of twist springback is proposed having been tested on a referenced sheet metal part. An experimental device for twist springback testing has been designed and the effect of blank rolling direction on the twist was investigated for dual-phase (DP) sheet steel. Finite element method (FEM) results of twisting behaviour using AutoForm software for different material models were compared with the experimental and the correlation evaluation was performed. 26 refs.

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Key Words: *Sheet Metal Forming, Twist Springback, FEM, Experiment*

THE IMPACT OF INFORMATION SHARING ON CONGESTION USING AGENT-BASED SIMULATION

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Abstract

The number of tourists to recreation areas has increased dramatically, leading to a growing concern about the congestion phenomena in these areas. Since the information provision has been introduced to reduce the congestion, its potential benefits as well as its drawbacks have been discussed controversially. In this work, we address a basic recreation area scenario with different patterns of information sharing and study the impact of them using agent-based simulation, where the tourists are modelled as agents. Three evaluation indicators are proposed to evaluate the performance of the strategies and both of the positive and negative of information sharing patterns are described. 20 refs.

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Key Words: *Recreation Areas, Congestion, Information Sharing, Multi-Agent Simulation*

AN APPROACH TO DYNAMIC SIMULATION OF INDUSTRIAL SAFETY MANAGEMENT

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Abstract

Achieving dynamic simulation of industrial safety management is of great significance for industrial safety management. To cover the shortage of existing simulation methods in being used in industrial safety management, especially their deficiency in integrating the theories, methods and technology achievements within multi-disciplinary and multi-field, an approach to dynamic simulation of industrial safety management is proposed in this paper based on knowledge unit and with the fusional computation of data, knowledge and model as the core of the approach. In this approach, the internal relations between data, knowledge and model are achieved by knowledge unit. And through the reasoning of knowledge unit network, the fusional computation of data, knowledge and model within various disciplines and fields is realized. Then the simulation of industrial safety management is further achieved. At the end of the paper, an example is analysed to prove the effectiveness of the proposed approach. 8 refs.

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Key Words: *Industrial Safety, Industrial Safety Management, Simulation*

PASSENGER TRANSFER EFFICIENCY OPTIMIZATION MODELLING RESEARCH WITH SIMULATIONS

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Abstract

An integrated optimization model is newly developed in this research to improve passenger transfer efficiency of an urban rail station by minimizing average waiting time of transfers in this station with rationalizing the arrival and departure time of trains in view of transfer passenger flows and their feeder services. Corresponding algorithm is also designed to search for the optimal solution to the objective function of the proposed model. A representative urban rail transfer station in Beijing is studied as example to validate the effect of transfer optimization with the new model. Comparative simulations confirm that the proposed model is able to effectively reduce the waiting time of each transfer in a station. This is significant for systematically improving the operation safety of an urban rail transfer station with faster evacuations of transfer passengers as well as substantially saving travel time of passengers making transfers in this station. 16 refs.

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Key Words: *Passenger Transfer Waiting Time, Urban Rail Transport Station, Train Arrival and Departure Time, Optimization Modelling, Simulation Analysis*

SAFETY-ORIENTED SPEED GUIDANCE OF URBAN EXPRESSWAY UNDER MODEL PREDICTIVE CONTROL

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Abstract

In order to improve the efficiency and safety level of urban expressway, speed guidance control was utilized to optimize the traffic flow. Inner ring expressway of Shanghai 5 km long was modelled in VISSIM and conflict statistical analysis was carried out in SSAM based on the data of vehicles trajectory. The collaborative optimization method to intervene the crash risk using speed guidance control was given. Log-linear model was established according to the speed-related variables and the model was adopted as the objective function of quantify traffic safety. Then simulation was carried out integrating MATLAB, VISSIM and VB.NET under extended macroscopic dynamic traffic flow model. Speed guidance control system oriented quantified traffic safety for urban expressway using model predictive control was established. Then numerical simulation was launched, the results show that total traffic conflicts decrease 29.1 %, travel time of monitoring link reduces 45.3 %, and variance of travel time reduces 47.8 %. Under the speed guidance control, safety and efficiency of expressway both have been improved, which has important reference for delicacy traffic control and management. 37 refs.

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Key Words: *Urban Expressway, Speed Guidance Control, Conflict Analysis, Log-Linear Model, Model Predictive Control*

OPTIMIZATION OF DISTRIBUTION ROUTE SELECTION BASED ON PARTICLE SWARM ALGORITHM

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Abstract

This paper mainly discusses the application of the particle swarm optimization in logistics distribution routing problems. Combining with the characteristics of logistics and distribution, it established a mathematical model of the distribution routing problem. Introducing three kinds of optimization strategies in the particle swarm optimization to optimize the particle swarm algorithm, constructing three different particle swarm algorithms of LinWPSO, SAPSO and RandWPSO, used respectively the standard of PSO, LinWPSO, SAPSO and RandWPSO to solve calculation cases of problems in logistics and route, the results showed that the performance of the LinWPSO, SAPSO and RandWPSO to solve vehicle routing problem is better than standard PSO. Performance of SAPSO is optimal, which can effectively solve vehicle routing problems of the logistics distribution, when the problem size increases, optimization advantages of the SAPSO will display fully, we can greatly shorten the delivery mileage by using the SAPSO to solve the logistics distribution routing problem. 13 refs.

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Key Words: *Supply chain, Logistics and Distribution, PSO*

MULTI-OBJECTIVE INTEGRATED PRODUCTION PLANNING MODEL AND SIMULATION CONSTRAINED DOUBLY BY RESOURCES AND MATERIALS

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Abstract

Based on analysing the defects of ERP planning system and researching related literatures, a multi-objective integrated production planning model is constructed which is constrained doubly by resources and materials. The model takes delivery on-time, reduces inventory, reduces overtime work, maintains safety inventory as its optimization objectives, and can achieve the integrated optimization of production planning, material requirements planning, resource requirements planning, inventory planning and overtime work planning. We build a mixed integer programming model and use Lingo to complete the model solution and simulation analysis, the case shows that the optimization method provided by the model has strong feasibility and effectiveness. 18 refs.

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Key Words: *Integrated Production Planning, Multi-Objective Optimization, Optimization Model, Resources, Materials, Simulation*
