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Introduction: special issue ICICTA 2012

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Mathematical Structures in Computer Science bridges the gap between theoretical computer science and software design. By publishing original perspectives from all areas of computing, the journal stresses applications from logic, algebra, geometry, category theory and other areas of logic and mathematics. Through issues such as this special issue, the journal also plans to play an occasional, but important role in the fields of intelligent computation and automation.

For this special issue, we have selected twenty three papers concerned with mathematical structures in the fields of intelligent computation and automation. These papers cover topics including:

— neural networks and stability research;
— non-linear systems and control methods;
— network control system analysis methods;
— advanced algorithm analysis and applications;
— multi-objective decision models and applications;
— software system modelling.

In particular:

— Guoquan Liu, Simon X. Yang, Yi Chai and Wei Fu report on research into delay-dependent robust stability criteria for stochastic neural networks of neutral-type with interval time-varying delay and linear fractional uncertainties.
— Qibing Jin, Liting Cao, Kun He, Kewen Wang and Beiyan Jiang describe the design of an IMC-PID controller based on MEOTF and its application in non-square processes with time delay.
— Bin Jiao and Shaobin Yan propose a cooperative co-evolutionary particle swarm optimiser based on a niche sharing scheme for the flow shop scheduling problem under uncertainty.
— Jianping Cai, Lujuan Shen and Fuzhen Wu analyse the adaptive control of uncertain non-linear systems preceded by backlash-like hysteresis.
— Ke Chen and Xuefeng Tong calculate and analyse the wave resistance of a hovercraft moving over an ice surface.
— Man Sun and Aimin Yang investigate the delay-dependent robust control of neutral time-delay systems.
— Jinlong Wang, Can Wen and Xiaoyi Wang make an empirical comparison of sales time series for online and offline channels for commodities in China.

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— Chuanliang Xia carries out a liveness and boundedness analysis of Petri net synthesis.
— Hongbo Li, Fuchun Sun, Zengqi Sun and Changqing Yuan study the H_∞ stabilisation of networked control systems with time delays and packet losses.
— Wang Hong-Xun, Wang Hong-Wei, Wang Xing and Wang Chao analyse the doppler frequency feature of aero deception active-passive-jamming.
— Jing Dai and Rui Zhou report on research on digital predistortion based on adaptive algorithms.
— Shaomei Yang and Qian Zhu describe the GA-SA model and apply it to a prediction of the potential of the solar industry.
— Dingxin Yang and Zheng Hu report on a dynamic analysis and numerical simulation of a discrete model of a bistable system.
— Yanjiang Li, Chong Tan, Jianting Lv and Xian Zhang analyse the robust stability of a class of uncertain neutral T-S fuzzy systems with time-delay.
— Hung-Cheng Chen proposes an optimal fuzzy PID controller design for an active magnetic bearing system based on adaptive genetic algorithms.
— Changqing Yuan, Yanhua Zhong, Jingrui Zhang, Hongbuo Li, Guojun Yang and Ying Shen describe a robust attitude tracking control scheme for multi-body spacecraft using a radial basis function network and terminal sliding mode.
— Wang Li, Zhu Qilin and Xu Xiaofang analyse the optimised assignment problem for airport gate configuration based on an immune genetic algorithm.
— Zhibin Qin, Huimei Li and Zhaohui Liu describe a multi-objective comprehensive evaluation approach to a river health system based on fuzzy entropy.
— Yumei Wu, Risheng Yang, Haifeng Li and Minya Lu propose a safety critical software reliability demonstration test method based on Bayesian theory.
— Wenyu Chen, Wenzhi Xie and Ru Zeng report on an improved algorithm for image feature-matching based on SIFT and SURF.
— Zhibin Liu and Aisheng Ren describe a hybrid WT-FBPNN optimisation algorithm to identify the investment risk of wind power projects.
— Gang Chen, Bo Sun, Xiaoming Liu and Erzhi Wang describe the robust optimisation of the spring actuator used in a vacuum circuit breaker.

Above all, the carefully selected papers included in this issue are representative of the latest advanced mathematical ideas and applications in the field of intelligent computation and automation, which we hope will attract a broad scientific readership in addition to a more specialised one.

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Guest editor of the special issue

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