

**MATHEMATICAL AND COMPUTER MODELLING****The detection system for greenhouse crop disease degree based on Android platform**

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*Computer Modelling & New Technologies 2016 20(3) 7-11*

A detecting way based on Android platform was proposed in order to detect greenhouse crop disease degree in real time. This way employed the camera in mobile phone to acquire crop disease leaf image in the greenhouse. Firstly, the detection system was built by the Eclipse based on the Android development environment. The iterative threshold segmentation algorithm was used to separate the crop disease leaf area from background. And the fuzzy C-means cluster algorithm was adopted to extract the disease spots. After analyzed the impact of different fuzzy weighted index  $m$  value, the value of  $m$  was selected 2 for the disease spots segmentation. After that the crop disease degree was determined based on the relevant standards and the total disease index of greenhouse was got based on disease index calculation standards. Finally, the calculating data could upload to the network server and was used management cloud achieved synchronous computer terminal query. The experimental results show that the detecting way could non-destructed measure the disease index of leaf diseases with non-destructive and exact in greenhouse.

**Keywords:** Android greenhouse crop disease index, cloud management real time non-destructive

**Relationships among convergence concepts of uncertain sequences**

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*Computer Modelling & New Technologies 2016 20(3) 12-16*

Uncertain sequence is a sequence of uncertain variables indexed by integers. In this paper, a new kind of sequence convergence that complete convergence was presented. Then, the relationships among complete convergence, convergence in  $p$ -distance, convergence in measure, convergence in distribution, convergence uniformly almost surely and convergence almost surely were investigated.

**Keywords:** uncertain measure, uncertain variable, expectation, convergence

**Supervised images classification using metaheuristics**

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*Computer Modelling & New Technologies 2016 20(3) 17-23*

Image classification is a fundamental task in image processing because it is a crucial step toward image understanding. This paper exploits metaheuristics (Ant Colony Optimization and Electromagnetic Metaheuristic) to tackle the problem of supervised satellite image classification. Earlier studies have been used the Intra-Class Variance (ICV) for images classification but this function has a limits to solve classification problem. This study presents the introduction of the Davies-Bouldin Index (DBI) to the supervised images classification. This index is used in two stages: training step and classification step. In training step this index serve as criteria for controlling iterations. In the classification step this index help to classify each pixel in the image to their appropriate class using the class centers found during the training stage. The experimental results show that the introduction of the Davies-Boulin index is very effective for supervised images classification and help the community of researches to improve the classification accuracy of remotely sensed data. The utility of metaheuristics is also demonstrated for satellite image of Oran city.

**Keywords:** image classification metaheuristics, Davies-Bouldin index, ant colony optimization, electromagnetic metaheuristic

**Powerdomains and modality, revisited with detailed proofs**

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*Computer Modelling & New Technologies 2016 20(3) 24-31*

We give direct detailed proofs for the connection between powerdomains and logic models which can be made about nondeterministic computations. In the proceeding of proofs, we prove some algebraic properties of them at the same time. Meanwhile, we take up some trick for constructing the finite branching tree, which can also be used into the other areas.

**Keywords:** Power domain, Nondeterministic, computation, Algebraic properties

**Improvement combined metrics routing of IP-telephony**

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*Computer Modelling & New Technologies 2016 20(3) 32-34*

The introduction of modern technologies in the production process is a pledge of improving the quality and efficiency. The introduction of IP-telephony - is no exception. The purpose of this article is to analyze basic modern routing protocols, identification of deficiencies. The task - to propose ways to improve algorithms of traffic routing optimization. This article briefly described mechanism of action of static routing. More are detailed modern dynamic routing protocols. As examples are presented RIP, OSPF, IGRP, EIGRP protocols, as most implemented in modern routing devices. It was a comparative analysis, revealed the advantages and disadvantages of the algorithms given routing protocols, was shown comparative table of described protocols with basic characteristics. Based on analyzed data were revealed existing challenges of routing protocols such as lack of consideration of an unlimited number of criteria and non-obviousness of impact of priority criteria to choosing route. It was suggested the most optimal solution implementation of the algorithm routing protocol in case of IP telephony, which simultaneously takes into account any amount of criteria and allows the administrator to intuitively distribute the impact those or other criteria of channel that to choose route of traffic through the node. Was analyzed example of the work of proposed algorithm, the conclusions are made.

**Keywords:** IP-telephony, packet switching, routing, multi-criteria optimization

**The Development of Risk Assessment System for Accidental Oil Spill in the Northern Caspian Sea**

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*Computer Modelling & New Technologies 2016 20(3) 35-41*

This article describes the development of a multifunctional geoinformation system RANDOM (Risk Assessment of Nature Detriment due to Oil spill Migration), realizing a multiprocessor calculation of probabilistic risk models to assess the negative impact of the oil spill on the biota of the North Caspian. The urgency of the problems associated with the development of oil fields in a very vulnerable shallow part of the Caspian Sea, where a major accident could have disastrous consequences. This article describes the development process from design to implementation to testing. The system is designed on the basis of service-oriented architecture (SOA), which allows for easy, flexible integration of services, and access them via the Internet. Through the use of SOA, the system can be expanded and upgraded. In this approach, the services may be located on physically different servers. Described in detail the process of parallel processing of large data set, shows the comparative tests on performance calculations. Tests have shown the benefit of using a supercomputer, it enables us to obtain a risk assessment for an adequate time. This system is designed for professionals in the field of ecology and mathematical modelling and subsoil oil fields on the continental shelf of the seas and oceans. RANDOM system as the final result of the decision of risk assessment tasks includes a series of calculation modules based on the methods of probability theory, computational mathematics, hydrodynamics, oil chemistry, marine biology, mathematical modelling and geoinformatics.

*Keywords:* GIS, RANDOM, Risk, Oil Spill, Caspian Sea