Evaluating potential risks related to radioactive irradiation in computed tomography studies

Ana Pitskhelauri

Annotation: Computed tomography (CT) is a modern commonly used method of radiological diagnostics. However, its higher prevalence is associated with higher burden of radiation exposure in patients undergoing diagnostic imaging and is considered to pose a substantial risk to the population through increasing the incidence of oncological diseases and mortality rates.

To increase the safety of CT and to considerably reduce the risk of oncological diseases and associated mortality it is necessary that patients undergo assessment of radiation exposure risks before choosing CT as a diagnostic method.

Collection of International Scientific-Practical Conference "Current Scientific Issues of Modernity"- 2017.

Computer Simulation of Contrast Agent Injection in Coronary Angiography

Donghak Kim, Irina Gotsiridze, Zviad Gurtskaia

Annotation: Coronary angiography is a relatively safe invasive procedure for coronary anatomy and pathology. In this paper, a simulation of contrast injection in coronary angiography is presented with focuses on visualization of coronary arteries and animation of contrast agent flow after contrast agent injection. This simulation is designed and implemented in Python programming environment. This simplified coronary angiography graphic simulator can be used for training medical students to analyze correctly and effectively images from coronary angiography.

Department of Biomedical Engineering

Hybrid Software Technologies and Data Engineering for Management Information Systems

Chogovadze G., Prangishvili A., Surguladze G.

Abstract:

The present book discusses topics of object-oriented analysis, design, development, testing, implementation and reengineering for software of management information systems based on using UML/Agile/ITIL methodologies, business process IT Service security standards BSI/COBIT, data relation and NoSQL/NewSQL type database management systems. In the present book, topics such as automation of design, designing simulation models for client-server and service oriented systems using Petri Colored Networks (CPN).

Experimental part has been carried out for problem areas of a University, commercial bank, multimodal transportation system, electronic elections, Black Sea Ecology monitoring system and a manufacturing business.

Practical problems have been carried out using hybrid technologies of programming (WPF, WF, WCF) under platform of MsVisual Studio.NET Framework 4.5. This book is intended for bachelor, master, doctoral students of Management Information Systems as well as readers interested in software engineering and data management topics.

ISBN 978-9941-20-790-7. Monogr., GTU, © Publication House "Technical University", Tbilisi, 2017. -1001 p.

From Information Systems to Information Society

Chogovadze G., Prangishvili A., Djagodnishvili T , Surguladze G.

Summary: The article discusses theoretical and practical issues of the educational and scientific process of forming information society based on multidisciplinary research. The most important is developing and research scientific direction of the Information Systems Engineering, Media Iinformatcs, Didactic of Informatics, Big Data Distributed Systems Management, Hybrid and Mobile Programming Technologies. This article presents results of multiple analysis of current and prospective educational and scientific works that that have been carried out at departments of Management Information Systems, Georgian Philology and Media Technologies under guidance of UNESCO department at GTU.

Transact. of GTU "Automated Control Systems". ISSN 1512-3979. N1(23). 2017, pp. 7-16.

Improving the Business Plan using the BPMN Standard

Nareshelashvili G., Kristesiashvili Kh.

Summary: The role of small businesses in the country's economy, its positive aspects and shortcomings is shown. The main causes of small business failures are indicated. A vital factor in its success is the simplification and improvement of the business plan. In the article, the structure of the business plan, brought to the standard, is considered, and in the case of a practical example, the BPMN business plan model is shown. Simulation of this model is carried out using the Bizagi Process Modeler platform.

Transact. of GTU "Automated Control Systems". ISSN 1512-3979. N1(23). 2017. Pp. 64-69.

Structure of the schemotechnical solution of the microwaves measuring device and possible options for use

Tamaz Dzagania, Elguja Butskhrikidze, Vladimer Phadiurashvili, Levan Zerekidze

Summary

We consider the structure of circuit solutions and the possible aspects of the use of the device – the meter micro current in electrical engineering and in other branches of science. said device is a device measuring a zero input impedance, low current values, long term feeding on the test object within the adjustment 0-2500 mw constant and stable voltage. Selection of sub-band is made accordingly the value of the measured current via the front panel 5 step switch. The measurement result is reflected in the digital display analog-to-digital converter.

Decision making based on fuzzy data. Fuzzy technologies

M. Akhobadze, N. Mchedlishvili

Annotation

In the textbook is given the fundamentals of Fuzzy set theory; the forms of representation of fuzzy sets, properties of functional properties, and Fuzzy-logic operators are discussed. The algorithms of solving mathematical models and applied tasks are represented.

Tbilisi, GTU publishing, 2017. P.158

Live Systems Analysis Methods (Optimization Methods and Classic Variation Accounting)

Obgadze T., Frangishvili A.

Annotation

In the manual methods of optimization and calculus of variations in examples and tasks are considered. Each new method is illustrated by the solution of a specific objective based on a Mathcad package. On the considered subjects, appropriate programs and the received results are provided. At the end of each chapter tasks for independent work of students are given.

Methods of the approximate solution of variation tasks are stated.

Work is intended for students of a magistracy and doctoral studies of the Georgian technical university.

Elementary mechanical tasks and sessions

T. Obgadze, N. Tushishvili, I. Davitashvili, N. Melanashvili

Annotation

In the guidebook there are represented the modern teaching methods and approaches of mechanics. The examples of task solving, precede the theoretical material.

The tasks are solved in the all field of mechanics and there is given the general rule of problem solving for students and future mechanical engineers.

Develop a Georgian Articles Encryption and Decryption Software Based on Blowfish Algorithm

Lela Gachechiladze, George Chokhonelidze

Annotation

The paper represented a software of Georgian articles encryption / decryption in objectoriented Java programming language. The software product used a symmetric encryption cryptographic algorithm created by famous cryptography Bruce Schneier's with called BLOWFISH. This algorithm is the key variable in length with a 64-bit cipher, however, key 448 bit resolution are available. The algorithm is distinguished by high

reliability and used in those cases, when frequent key change is required, and process of data encryption / decryption requires high speed.

Georgian Technical University. Transactions Automated Control Systems. №1(23) 2017.

Structural Analysis and Control of Complex Systems

M. Akhobadze, E. Kurtskhalia, B. Mesablishvili

Annotation

In modern science, many different scientific disciplines and knowledge are integrated for the explanation, identification and study series of events, processes or objects as single systems. Moreover often single system reveals other nature or properties rather than its elements.

The system represents combination of elements interconnected for some reason. The main characteristics of the system, determined as single system, are defined by its structure - the relationship between its parts and elements.

Graphical methods are mostly used methods for systems structure research. The most usable methods of system structure research are graphical methods. Other known methods are: catastrophe theory, cluster analysis and etc. Though the lack of these theories is that don't include the properties of the system's elements. The best method for the study of systems' structure and its elements is **q-Analysis** Method first introduced by Atkin. The method allows to describe and analyze system's structure and to understand the mechanism of system formation, to determine the reasons of system degradation, regularities and determinants, to calculate its quantitative and qualitative characteristics, etc.

q-analysis is used for the analysis, mathematical modeling and control of such systems as social, economic, tax, electoral, technical, etc.

The manual reviews mathematical modeling and control methods of macro systems as well as practical examples of using of obtained results based on **q-analysis.**

The book will be of great importance for the students, postgraduates, lecturers, scientists, managers, representatives of innovative businesses interested in modern management and decision-making problems and issues related to the realization of sustainable economical processes.

Reference manual. Tbilisi, 2017, 180 p.

Algorithm for continuous urban green zones

M. Akhobadze, K. Janjgava

Annotation

Urban systems planning requires rational use of natural resources, preservation of urban fauna and flora to ensure ecological balance of the region. For this purpose it is necessary to develop a network of continuous Green Zones, ecological corridors.

The article considers the algorithm based on algebraic topology, on so called Q-Analysis Method, which allows us optimal planning of the region by system approach and in case of its implementation, it would be possible to avoid ecological disaster and ensure the evolution of flora and fauna appropriately.

GTU, Faculty of Architecture, Urban Planning and Design. Scientific Conference - "Modern Problems of Tbilisi Architecture and Urban Construction", May 21, 2017.

Mathematical Basis of Fuzzy Set Theory: Fuzzy Algorithms

M. Akhobadze

Annotation

The manual considers mathematical basis of Fuzzy set theory with reference to viewpoint that human mind elements are not numbers. They are elements of certain Fuzzy sets of objects classes for which the transition from the “membership of the class” to the “not membership of the class” is not jump-like but continuous. Due to the fuzziness characterizing human thinking we can conclude that the basis of this process is the logic of fuzzy truth, fuzzy connections and conversion by fuzzy rules. In our opinion, such fuzzy logic plays a key role in important one of the most important skills - information assessment skills. The guidebook is intended for bachelor, master and PhD students of informatics and control systems specialty.

Reference manual, GTU "IT-Consulting Scientific Center", 2017, ISBN 978-9941-0-8693-9, 90 p.

Research Investigation on Automatic Control System of Drying Apparatus Based on Fuzzy Logic

A. Bardavelidze, Kh. Bardavelidze, I. Basheleishvili

Abstract

The paper describes current problems of residual moisture control loop of drying material in a dryer, for automation of drying processes and their solving by means of fuzzy controller. The paper also presents the results of realization of automatic control system of different configurations, as well as their comparative analysis. The effectiveness of using fuzzy controllers is shown by an example of a drying apparatus control system.

Journal of Technical Science & Technologies, Vol. 5, Issue 2, July 2017, pp. 33-35

Adaptive Real-World Algorithm of Solving MDVRPTW (Multi Depots Vehicle Routing Planning with Time Windows) Problem

A. Pranghishvili, I. Rodonaia, O. Shonia, A. Merabiani

Annotation

The adaptive algorithm to solve MDVRPTW problem is proposed in the paper. Realistic real-world situations, such as presence of various congestion types on roads, are carefully considered and accounted for in the algorithm. To overcome the lack of realistic and reliable methods of congestion duration estimation we use the MatSim large-scale agent-based simulation tool. This tool allows users to compose and run complex simulation models that are extremely close to the real-world situations. Our approach implements also autonomic components ensembles concept. Each vehicle is associated with the corresponding autonomic component AC (a virtual machine in datacenter) and exchange on-line information with other vehicles. Besides, ACs can reschedule routes in order to find the acceptable alternative routes that enable vehicles to meet time windows requirements and, at the same time, avoid the congested roads. The adaptive algorithm is able to reschedule and find alternative routed for several vehicle in parallel, which increases the performance of proposed approach.

International Journal of Transportation Systems, http://www.iaras.org/iaras/journals/ijts