Engineering Village™

1. **A Model of Mobile Application for Automatic Fish Feeder Aquariums System**
Prangchumpol, D. **Source:** *International Journal of Modeling and Optimization*, v 8, n 5, 277-80, Oct. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.665; **Publisher:** IACSIT Press, Singapore

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Abstract: Currently, ornamental fish in the office is popular among the fishers and fish farmers because this can create the good environment in an area. Thus, fishers have to pay attention in caring and control all kinds of factors such as feeding, air pumps, light, and pH value of water which may affect to the quality of water and fish maybe dead. With the advancement of IoT technology that is used to control wireless gadgets, this research developed an automatically fish feeding system that works through a mobile application. By writing device control commands onto the microcontroller device, users, through a mobile application, can control timing and amount of fish food according to the number of fish automatically, as well as warning when pH value of water is not proper. After testing from experts and users, the study found that an average value in the efficiency of this system was 4.16 which is considered that this application can control fish aquarium efficiently, and decreased spoiled water regarding to improper fish feeding. (18 refs.)

Inspec controlled terms: aquaculture - microcontrollers - mobile computing

Uncontrolled terms: microcontroller device - device control - automatically fish feeding system - IoT technology - air pumps - fish farmers - ornamental fish - automatic fish feeder aquariums system - mobile application - fish aquarium - fish food

Classification Code: B1265F Microprocessors and microcomputers - C7860 Agriculture, forestry and fisheries computing - C6190V Mobile, ubiquitous and pervasive computing - C5130 Microprocessor chips

IPC Code: A01K61/00 - G06F9/44 - G06F15/76

Treatment: Practical (PRA)

Database: Inspec

2. **Iterated Local Search Solution for the Non-convex Economic Dispatch Problem**
Nahas, N.; Abouheaf, M.; Sharaf, A.; Gueaieb, W. **Source:** *International Journal of Modeling and Optimization*, v 8, n 6, 326-33, Dec. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.673; **Publisher:** IACSIT Press, Singapore

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Abstract: The objective of the Economic Dispatch problem is to allocate the total power generation to the generating units to meet a given total active-load demand. This problem cannot be solved using the traditional analytical approaches, due to the high non-convexity of the objective cost functions. This work introduces an iterated local search algorithm that employs the great deluge search method to solve the non-convex Economic Dispatch problem. This algorithm has demonstrated efficiency in solving various NP-hard problems but has never been applied to solve the Economic Dispatch problems. The performance of the proposed algorithm is compared to those of other search algorithms using standard benchmarks. The simulation results verified the superior performance of the proposed algorithm compared to the other approaches. (17 refs.)

Inspec controlled terms: concave programming - iterative methods - power generation dispatch - power generation economics - search problems

Uncontrolled terms: nonconvex economic dispatch problem - power generation system - standard benchmarks - deluge search method - active-load demand - NP-hard problems - iterated local search algorithm - objective cost functions

Classification Code: B8110B Power system management, operation and economics - B0260 Optimisation techniques - B0290F Interpolation and function approximation (numerical analysis)

Treatment: Economic (ECO); Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

3. **Estimation of Energy Consumption when Wearing Power Assist Suits**
Araie, T.; Nishizawa, U.; Ikeda, T.; Kakimoto, A.; Toyama, S. **Source:** *International Journal of Modeling and Optimization*, v 8, n 2, 95-100, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.631; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Polytech. Univ. of Japan, Kodaira, Japan
Tokyo Univ. of Agric. & Technol., Koganei, Japan

Abstract: Agricultural power assist suits (PAS) have been developed and researched in our laboratory. In this study, the performance of a PAS is evaluated without burdening subjects through kinetic simulation. According to the formula for deriving energy consumption, the ratio of the energy consumption to the joint torque is same. Therefore, the joint torque of the knee is derived to investigate the influence of kinetic simulation the on femur. According to kinetic simulation, a PAS can reduce energy consumption. Further, the performance of PAS can be extracted by adjusting size. The validity of simulation is evaluated by comparing with other results. The simulation results and dynamics calculations agree well, but the actual measurements of some subjects show differences. The factors considered are the measurement error of the joint angle, difference in the position for pasting the electrode to measure the myopotential, and the asymmetry of muscle tension. Differences with considerable errors were observed for some test subjects in comparison with actual values, but a good match was observed for the case in which the PAS was worn for those test subjects that also showed a good match for the case without the PAS. (13 refs.)

Inspec controlled terms: artificial limbs - biomechanics - bone - energy consumption - measurement errors - medical control systems - muscle - torque - wear

Uncontrolled terms: energy consumption - joint torque - kinetic simulation - PAS - simulation results - test subjects - power assist suits - agricultural power

Classification Code: C3385 Biological and medical control systems - E1710 Engineering materials

IPC Code: A61F2/50

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

4. **Gaussian Copula Marginal Regression Modeling for Technology Analysis**
Sunghae Jun **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 150-3, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.640; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Cheongju Univ., Chungbuk, Korea, Republic of

Abstract: Understanding technological relations between patent technology keywords is an important task for building research and development (R&D) policy of nation and company. Many researches have been actively conducted on this research subject, and various approaches to technology analysis were studied in the field of technology management. Most of the methods of technology analysis were based on patent documents related to target technology, because patent contains diverse information on developed technologies. So the patent keywords extracted from patent documents are valuable sources for technology analysis. The structured patent data become a matrix consisting of patent (row) and keyword (column), and each element of the matrix is frequency value of the keyword occurred in each patent. In this paper, we propose a method of technology analysis using Gaussian copula marginal regression (GCMR) model, and use the R data language for patent analysis by the GCMR. In addition, we carry out a case study to show how this study could be applied to real problem. This research contributes to various R&D planning of nation and company. (20 refs.)

Inspec controlled terms: document handling - Gaussian processes - information retrieval - law administration - patents - regression analysis - technology management

Uncontrolled terms: Gaussian copula marginal regression modeling - technology analysis - technological relations - patent technology keywords - technology management - patent documents - patent keywords - structured patent data - Gaussian copula marginal regression model - patent analysis - research and development policy - R data language - R&D planning

Classification Code: C7130 Public administration - C6130D Document processing techniques - C1140Z Other topics in statistics - C7250R Information retrieval techniques

IPC Code: G06F17/21 - G06F17/30 - G06Q50/18 - G06Q50/26

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

5. **Indonesia's Electricity Dynamic Modelling toward Its National Policies**
Sulistio, J.; Rosyadi, A. **Source:** *International Journal of Modeling and Optimization*, v 8, n 6, 311-14, Dec. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.670; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Univ. Islam Indonesia, Yogyakarta, Indonesia

Abstract: In the past five years, similar with the south east region's economic growth's, Indonesia's average is 5,1%. This growth leads an increase in energy consumptions, especially electricity. Indonesian government aware of this situation and create policies to address it. This article objective is to build a dynamic model of Indonesia's electricity demand. System dynamics proofed to show fruitful result for similar objective in other area. Therefor this article exercise system dynamics to build the model. Validation is essential to develop model credibility. For that reason, four techniques in system dynamics validations are applied. There were operational graphics, face validity, extreme condition test and historical data validation. The model shows that up to 2020, Indonesia will still be facing energy deficit. A surplus shown in 2021 and forward. Hence, Indonesian government's policies in energy will be a success. (9 refs.)

Inspec controlled terms: electricity supply industry - government policies - industrial economics

Uncontrolled terms: operational graphics - south east region economic growth - Indonesia electricity dynamic modelling - energy deficit - historical data validation - face validity - system dynamics validations - model credibility - article exercise system dynamics - Indonesia's electricity demand - Indonesian government aware - energy consumptions - national policies

Classification Code: E3040 Public utilities - E0220 Economics - E0260 Social and political issues

Treatment: Practical (PRA)

Database: Inspec

6. **Dynamic model for determining technological and economic parameters for precision pigs farming**
Gaazi, B.; Daskalov, P.; Georgieva, T.; Kirilova, E. **Source:** *International Journal of Modeling and Optimization*, v 8, n 5, 272-6, Oct. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.664; **Publisher:** IACSIT Press, Singapore

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Abstract: Dynamic model for determining technological and economic parameters for precision pigs farming is proposed in the paper. The model includes equations describing the temperature-humidity processes, growth, feed consumption and heating in the building, depending on the controlling inputs and the measurable disturbances movements on the building's microclimate. A cost-effective temperature is determined to maximize growth and minimize feed and energy consumption by using the Direct Search optimization procedure in Matlab. A cost effective temperature for 9 climatic zones of Bulgaria in winter season for fattening pigs 45 and 90 kg has been found. The economically efficient temperature for 45 kg pigs is determined between 20,86

degC - 18,58 degC for different climatic zones of Bulgaria. For 90 kg pigs the economically efficient temperature is calculated and the results show that the temperature is the same for all climatic zones -17.81 degC. (19 refs.)

Inspec controlled terms: climatology - economics - energy consumption - farming - heating - Matlab - optimisation

Uncontrolled terms: Bulgaria climatic zones - direct search optimization procedure - Matlab - buildings microclimate - pigs farming - dynamic model - cost effective temperature - energy consumption - heating method - feed consumption - temperature-humidity processes - economic parameters - temperature 1858.0 degC to 2086.0 degC - mass 45.0 kg - mass 90.0 kg - temperature -17.81 degC

Classification Code: E3010 Agriculture - E0210G Optimisation - E0220 Economics

IPC Code: A01 - G06F17/10 - G06F8/40

Treatment: Economic (ECO); Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

7. **Parallel Preprocessing for the Optimal Camera Placement Problem**
Bre´villiers, M.; Lepagnot, J.; Kritter, J.; Idoumghar, L. **Source:** *International Journal of Modeling and Optimization*, v 8, n 1, 33-40, Feb. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.621; **Publisher:** IACSIT Press, Singapore

Author affiliation:
LMIA Res. Lab., Univ. de Haute-Alsace, Mulhouse, France

Abstract: This paper deals with the preprocessing needed for the optimal camera placement problem, which is stated as a unicost set covering problem (USCP). Distributed and massively parallel computations with graphics processing unit (GPU) are proposed in order to perform the reduction and visibility preprocessing respectively. An experimental study reports that a significant speedup can be achieved, and we give a general heterogeneous parallel approach that brings together these parallel computations. In addition to that, a set-based differential evolution (DE) method is applied to solve 10 instances of the considered problem, and promising results are reported. (12 refs.)

Inspec controlled terms: cameras - evolutionary computation - graphics processing units - optimisation - parallel processing - search problems - set theory - video surveillance

Uncontrolled terms: parallel preprocessing - optimal camera placement problem - unicost set covering problem - massively parallel computations - graphics processing unit - reduction - visibility - general heterogeneous parallel approach - USCP - distributed computation - GPU - set-based differential evolution method - DE method

Classification Code: B6135E Image recognition - B7230G Image sensors - B0260 Optimisation techniques - B0250 Combinatorial mathematics - C1180 Optimisation techniques - C6190P Parallel software - C1160 Combinatorial mathematics - C5260B Computer vision and image processing techniques - C5260D Video signal processing

IPC Code: G03B17/00 - G03B19/00 - G06F9/46 - G06T - G06T1/20 - H04N5/30

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

8. **Model Predictive Controller for Air Flow and Heat Transfer in Sample Room**
Khamput, S.; Rattanadecho, P.; Keangin, P. **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 172-7, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.644; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Dept. of Mech. Eng., Mahidol Univ., Nakhon Pathom, Thailand

Abstract: Energy is necessary for human life. However, various public organizations concern about the limited energy. Therefore, the improving of energy efficiency for building could help the reduction of the energy consumption and costs. The purpose of this study is to investigate the effects of different insulation material, namely brick, polystyrene, stone wool and phenolic foam that applied to sampled room by computational simulation. Three-dimensional model of sample room is presented. The time-dependent fluid dynamic equations coupled with the time-dependent heat transfer equation with diffusion and convection is implemented to predict air flow and heat transfer inside the sample room. The governing equations are solved by using the finite element method (FEM). Computational results of numerical study are compared to results with experimental study. The results indicated that the types of insulation material have the significant effects on the air flow and heat transfer. Furthermore, the stone wool is the best insulation that reduces heat transfer into the room. The obtained results provide useful information on the building designs under a variety of conditions and reduce energy consumption in building. (10 refs.)

Inspec controlled terms: computational fluid dynamics - convection - finite element analysis - heat transfer - insulating materials - predictive control - thermal insulating materials

Uncontrolled terms: model predictive controller - air flow - sample room - public organizations concern - energy efficiency - energy consumption - different insulation material - stone wool - sampled room - three-dimensional model - time-dependent fluid dynamic equations - time-dependent heat transfer equation

Classification Code: A0260 Numerical approximation and analysis - A4710 General fluid dynamics theory, simulation and other computational methods - C1330 Optimal control - E2120 Heat and thermodynamic processes (mechanical engineering) - E0210L Numerical analysis

IPC Code: F16L59/00 - F28

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

9. **Application of Hurst Exponent (H) and the R/S Analysis in the Classification of FOREX Securities**
Raimundo, M.S.; Okamoto, J., Jr. **Source:** *International Journal of Modeling and Optimization*, v 8, n 2, 116-24, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.635; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Dept. of Mechatron. Eng. & Mech. Syst., Univ. of Sao Paulo, Sao Paulo, Brazil

Abstract: This paper presents the relationship between the Hurst Exponent (H) and the Rescaled Range Analysis (R/S) in the classification of Foreign Exchange Market (FOREX) time series by the supposition of the existence of a Fractal Market in an alternative to the traditional theory of Capital Markets. In such a way, the Hurst Exponent is a metric capable of providing information on correlation and persistence in a time series. Many systems can be described by self-similar fractals as Fractional Brownian Motion, which are well characterized by this statistic. (43 refs.)

Inspec controlled terms: Brownian motion - econophysics - fractals - time series

Uncontrolled terms: Hurst Exponent - R/S Analysis - FOREX securities - Rescaled Range Analysis - Foreign Exchange Market time series - Fractal Market - Capital Markets - self-similar fractals - fractional Brownian motion

Classification Code: A0580 Econophysics - A0250 Probability theory, stochastic processes, and statistics - A0540 Fluctuation phenomena, random processes, and Brownian motion - A0555 Fractals

Treatment: Theoretical or Mathematical (THR)

Database: Inspec

10. **Development of Multimodal Strategy Board for Improving Competitiveness in Goalball**
Ikeda, T.; Araie, T.; Kakimoto, A.; Ninomiya, K.; Ikeda, K. **Source:** *International Journal of Modeling and Optimization*, v 8, n 4, 212-16, Aug. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.652; **Publisher:** IACSIT Press, Singapore

Author affiliation:
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Abstract: With the approach of the 2020 Tokyo Olympics and Paralympics, interest in sports for participants with disabilities has been steadily increasing. For Japan to be successful in the Paralympic sports, scientific and engineering support similar to that provided to other Olympic competitors is necessary. This study develops a multimodal strategy board to improve Japan's competitiveness in goalball, a team sport for visually impaired players. The proposed tool is composed of an image processing system that determines the ball's position and movement, and a strategy board that provides tactical information. This paper describes the method used to determine ball position from game video and the structure of a haptic device incorporated into the strategy board. (10 refs.)

Inspec controlled terms: computer games - handicapped aids - haptic interfaces - sport

Uncontrolled terms: multimodal strategy board - improving competitiveness - goalball - Paralympic sports - scientific engineering support - Olympic competitors - Japan's competitiveness - team sport - visually impaired players

Classification Code: B6135 Optical, image and video signal processing - C5260B Computer vision and image processing techniques - C6180 User interfaces - C7830D Computer games

- C7850 Computer assistance for persons with handicaps

IPC Code: A63F13/00 - G06T

Treatment: Practical (PRA)

Database: Inspec

11. **Learner's Perception on Open Learner Model**
Hamzah, A. **Source:** *International Journal of Modeling and Optimization*, v 8, n 4, 250-3, Aug. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.660; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Dept. of Inf., Univ. Islam Indonesia, Yogyakarta, Indonesia

Abstract: There are various way could be done to improve the performance of students' learning activity. In open learner model (OLM), students can track their learning record and increase the endeavour in case there is low score. However, in OLM-based system, there are various kind of user. This paper aims to examine the perception of learner to open learner model adoption in higher education. We developed and implemented a simple open learner model system with which students can monitor their learning performance. We deploy a questionnaire after that and gain some insight about students' perception regarding the system they use. The result shows that the majority of students agreed to the benefit from OLM adoption eventhough there are several issues regarding to privacy. The findings is followed by discussing the future works to be done. (16 refs.)

Inspec controlled terms: computer aided instruction - further education

Uncontrolled terms: learning performance - OLM adoption - learning record - OLM-based system - learner model adoption - student learning activity - learner perception - open learner model system

Classification Code: C7810C Computer-aided instruction

IPC Code: G09B5/00

Treatment: Practical (PRA)

Database: Inspec

12. **Evaluation of Resistance against Vibration and Shock Resistance on Spherical Ultrasonic Motor**
Nishizawa, U.; Oohashi, T.; Toyama, S. **Source:** *International Journal of Modeling and Optimization*, v 8, n 2, 68-73, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.626; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Tokyo Univ. of Agric. & Technol., Koganei, Japan

Abstract: The spherical ultrasonic motor which drives in the space environment has been developed by this research. It has been evaluated with regard to high temperature and low

temperature which assumed the space environment as the previous studies. On the other hand, a vibration and a shock assumed at launch of a rocket are severe condition, but the spherical ultrasonic motor has to stand up to the vibration and the shock. So it was evaluated with regard to resistance against vibration and shock resistance to the spherical ultrasonic motor by this research. The natural frequency of the spherical ultrasonic motor was calculated and theoretical calculation about the breaking strength by the vibration was performed as evaluation method. And a result of the theoretical calculation was verified by a resonance search experiment and a stimules experiment. As a result, the resistance against vibration of the spherical ultrasonic motor was clarified. And the shock resistance of the spherical ultrasonic motor was confirmed to shock acceleration of 40 G. (9 refs.)

Inspec controlled terms: electric resistance - electric shocks - ultrasonic motors - vibrations

Uncontrolled terms: space environment - shock acceleration - resonance search experiment - theoretical calculation - natural frequency - rocket launch - vibration - spherical ultrasonic motor - shock resistance

Classification Code: B8340C Piezoelectric motors

IPC Code: H02N2/10

Treatment: Practical (PRA); Theoretical or Mathematical (THR); Experimental (EXP)

Database: Inspec

13. **Dynamic Mechanism of High-speed Railway on Urban Social-economic Development in Yangtze River Economic Zone**
Minghao Zhu **Source:** *International Journal of Modeling and Optimization*, v 8, n 1, 1-7, Feb. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.615; **Publisher:** IACSIT Press, Singapore

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Beijing Jiaotong Univ., Beijing, China

Abstract: In this study, the author aims to investigate the inner law between high-speed railway (HSR) and economic development. Beijing-Shanghai High-speed Railway, as a case is simulated to find out how these relationships could be established, and the system dynamic is used to build a system model. The case results have revealed that the HSR has a strong influence on the development of the tertiary industry because of its passenger characteristics, and it has an overall positive effect on the GDP, especially secondary and tertiary industries. It has greatly contributed to the movement of the employed population from traditional agriculture to manufacturing and services industry. The findings of this study could not only serve as a reference for HSR planning, but also could guide employees moving to the more reasonable areas related to skill, knowledge and other information, which would subsequently improve urban economic. (14 refs.)

Inspec controlled terms: railways - rivers - socio-economic effects - town and country planning

Uncontrolled terms: service industry - manufacturing industry - traditional agriculture - HSR planning - tertiary industry - system model - system dynamic - Beijing-Shanghai High-speed Railway - inner law - yangtze river economic zone - urban social-economic

development - dynamic mechanism

Classification Code: A9190 Other topics in solid Earth physics - A9240F Rivers, runoff, and streamflow - A9330D Asia

IPC Code: B61

Treatment: Theoretical or Mathematical (THR)

Database: Inspec

14. **Modeling, Simulation and Assisted Research with LabVIEW Instrumentation in Robotics**
Olaru, A.; Olaru, S.; Mihai, N. **Source:** *International Journal of Modeling and Optimization*, v 8, n 6, 301-5, Dec. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.668; **Publisher:** IACSIT Press, Singapore

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ACTTM Agency, Bucharest, Romania
Technoaccord Co., Montreal, QC, Canada

Abstract: The field of Robotics is so complicated in the research activity and impose the assisted work by computer, because all equations, all mathematical models are written in matrix form, all movements are in the space and the control of the movements are so difficult. More, the optimization of the dynamic behavior by using the optimal choose of the constructive or functional parameters are very difficult without assisted research, the optimization by apply some electrical or mechanical corrections also are very difficult because must be establishing the place of application, the parameters of all these corrections. The assisted research with one special LabVIEW virtual instrumentation library cover all these actions and assures one easy way to the optimal results. (15 refs.)

Inspec controlled terms: mathematical analysis - matrix algebra - robots - virtual instrumentation

Uncontrolled terms: optimization - matrix formation - mathematical models - robotics - LabVIEW instrumentation

Classification Code: B7210B Computerised instrumentation - B0210 Algebra - B0220 Mathematical analysis - C7410H Computerised instrumentation - C1110 Algebra - C1120 Mathematical analysis

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

15. **Effect of Vaccination to the Transmission Model of H1N1 Virus**
Sungchasit, R.; Pongsumpun, P. **Source:** *International Journal of Modeling and Optimization*, v 8, n 1, 24-9, Feb. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.619; **Publisher:** IACSIT Press, Singapore

Author affiliation:

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Fac. of Sci., King Mongkut's Inst. of Technol. Ladkrabang, Bangkok, Thailand

Abstract: A model for the transmission of H1N1 virus in a constant human population is studied. Swine flu is a respiratory disease caused by viruses that infect the respiratory tract of pigs, resulting in nasal secretions, a barking cough, decreased appetite, and listless behavior. Swine flu produces most of the same symptoms in pigs as human flu produces in people. H1N1 influenza epidemic reported severe disease caused by a co-infection of dengue virus and influenza H1N1. Both dengue fever and influenza have a wide range of clinical presentations with many overlapping features, and overlap hinders the differentiation of the two diseases. In this paper, we develop the mathematical model which can describe the transmission of this disease. The standard dynamical modelling method is used for analyzing the model. The simulation outputs for the different set of parameters are given in this paper. The results of this study should introduce the way for reducing the outbreak. (16 refs.)

Inspec controlled terms: diseases - epidemics - microorganisms

Uncontrolled terms: respiratory disease - respiratory tract - pigs - nasal secretions - barking cough - decreased appetite - swine flu - human flu - H1N1 influenza epidemic - severe disease - dengue virus - dengue fever - mathematical model - standard dynamical modelling method - transmission model - constant human population

Classification Code: C1290L Systems theory applications in biology and medicine

Treatment: Theoretical or Mathematical (THR)

Database: Inspec

16. **A New Simulation Method for UAV Communication Channels Based on GPUs**
Xujun Hu; Xiaomin Chen; Qiuming Zhu; Weizhi Zhong; Bin Chen **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 154-9, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.641; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Coll. of Electron. & Inf. Eng., Nanjing Univ. of Aeronaut. & Astronaut., Nanjing, China

Abstract: In this paper, an unmanned aerial vehicle (UAV) communication channel model is established by considering the propagation path loss, shadowing, and multi-path fading. Moreover, an efficient generation method for Gaussian random processes based on sum of sinusoids (SoS) theory is presented and is easy to realize by a graphics processing unit (GPU). Based on the proposed method, a new real-time generation method for multi-path shadowing composite fading is designed and implemented. The implementation results show that the proposed approach enables the easy generation of multi-path shadowing composite fading while reducing the processing time. Meanwhile, the impacts of flight altitude and communication scenarios on the performance of the UAV communication system are discussed. The results of this paper should have significant application value in UAV communication channel simulation. (19 refs.)

Inspec controlled terms: aircraft communication - autonomous aerial vehicles - fading channels - Gaussian processes - graphics processing units - multipath channels - radiowave propagation - random processes - remotely operated vehicles

Uncontrolled terms: new simulation method - UAV communication channels - unmanned

aerial vehicle communication channel model - propagation path loss - multipath fading - efficient generation method - Gaussian random processes - sinusoids theory - graphics processing unit - real-time generation method - implementation results - easy generation - multipath shadowing composite fading - processing time - flight altitude - communication scenarios - UAV communication system - UAV communication channel simulation

Classification Code: B0240Z Other topics in statistics - B5210C Radiowave propagation - B6250 Radio links and equipment - C3360L Aerospace control - C3390C Mobile robots

IPC Code: G05D1/00 - G06T1/20 - H04B7/00 - H04W - H04W84/18

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

17. **AFL Extended with Test Case Prioritization Techniques**
Gen Zhang; Xu Zhou **Source:** *International Journal of Modeling and Optimization*, v 8, n 1, 41-5, Feb. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.622; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Coll. of Comput., Nat. Univ. of Defense Technol. Changsha, Changsha, China

Abstract: Fuzzing is an efficient testing technique to expose bugs and vulnerabilities and fuzzers extended with coverage information can generate interesting results and find potential bugs in programs. However, previous coverage-based fuzzers, such as American Fuzzy Lop (AFL), fail to realize the importance of the order of input test cases or they are unable to adopt significant and useful coverage information, so some of them suffer from dramatically poor performance. Meanwhile, the main idea of test case prioritization (TCP) in the field of software testing is to rank the test cases according to a certain rule, helping expose bugs and vulnerabilities. Thus our work concentrates on complementing AFL with the characteristics of TCP and improving the performance of the original AFL. In this paper, we present a brand-new fuzzing technique combining essential and practical coverage information and prioritization properties commonly used in TCP, which fundamentally enhancing the process of creating new test cases and finding bugs. We implement our method by extending state-of-the-art fuzzer AFL with TCP techniques and evaluate it on 6 widely-used and open source programs from GNU. We conduct experiments on 6 target programs to illustrate our performance on bug detection. On all of these experiments, improvement of our method is witnessed and significantly better outcomes are generated. (31 refs.)

Inspec controlled terms: program debugging - program testing - security of data

Uncontrolled terms: AFL extended - test case prioritization techniques - efficient testing technique - expose bugs - vulnerabilities - interesting results - potential bugs - previous coverage-based fuzzers - American Fuzzy Lop - input test cases - significant coverage information - useful coverage information - dramatically poor performance - software testing - original AFL - essential coverage information - practical coverage information - prioritization properties - finding bugs - state-of-the-art fuzzer AFL - TCP techniques - bug detection

Classification Code: C6150G Diagnostic, testing, debugging and evaluating systems - C1160 Combinatorial mathematics - C6130S Data security

IPC Code: G06F11/36 - G06F21/00

Treatment: Practical (PRA)

Database: Inspec

18. **Implementing virtual 3D model and augmented reality navigation for library in university**
Jomsri, P. **Source:** *International Journal of Modeling and Optimization*, v 8, n 6, 315-17, Dec. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.671; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Dept. of Inf. Technol., Suan Sunandha Rajabhat Univ., Bangkok, Thailand

Abstract: The library is an important place for searching data in the university in form of both hardcopy and digital. In case of hardcopy form, users need to locate books or media which consume long time in finding what they want. To enhance efficiency in finding books in libraries, this study applied 3D and augment reality technology in searching for books. By developing a model system with 3D and AR technology to locate books on the shelves in Suan Sunandha Rajabhat University's library, this study found that the accuracy rate of the system was 96.5% and satisfaction rates of users in using 3D and Augmented Reality in the library was good level. (10 refs.)

Inspec controlled terms: academic libraries - augmented reality - research libraries

Uncontrolled terms: reality technology - virtual 3D model - augmented reality navigation - hardcopy form - Suan Sunandha Rajabhat University's library

Classification Code: C7210 Information services and centres - C6130V Virtual reality

Treatment: Practical (PRA)

Database: Inspec

19. **Design of Underwater Coordinate Measuring Machine Using Multi-joint Link**
Shimono, S.; Nishizawa, U.; Toyama, S. **Source:** *International Journal of Modeling and Optimization*, v 8, n 4, 232-5, Aug. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.656; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Q.I Inc., Yokohama, Japan
Tokyo Univ. of Agric. & Technol., Koganei, Japan

Abstract: In this paper, an underwater positioning system that consists of underwater robot and multi-joint serial link. The serial link is connected to the underwater robot from the water surface. The position of the underwater robot is obtained from kinematics of the serial link. The experimental model for evaluation of the proposed system is developed and its detail is explained. Then positioning error due to the joints angle measurement error is evaluated and influence of the underwater environment to the proposed positioning system is also discussed. (7 refs.)

Inspec controlled terms: angular measurement - coordinate measuring machines -

measurement errors - mobile robots - path planning - position control - robot dynamics - underwater acoustic communication - underwater vehicles

Uncontrolled terms: underwater coordinate measuring machine - multijoint link - underwater positioning system - underwater robot - serial link - joints angle measurement error - underwater environment

Classification Code: B7320C Spatial variables measurement - B6270 Acoustic and other telecommunication systems and equipment - C3390C Mobile robots - C3120C Spatial variables control - E2230 Robot and manipulator mechanics

IPC Code: B63B - B63G8/00 - G01B - G01B5/008 - G01C1/00 - G05D1/00 - G05D3/00 - H04B11/00 - H04B13/00 - B60W30/095

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

20. **Adaptive balancing by counterweights of robots and mechatronic systems**
Ciupitu, L.; Vladareanu, L. **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 178-82, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.645; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Politeh. Univ. of Bucharest, Bucharest, Romania
Inst. of Solid Mech., Romania

Abstract: Present paper is dealing with the adaptive static balancing of robot or other mechatronic arms that are moving in vertical plane and whose static loads are variable, by using counterweights. A simple passive and approximate solution is proposed and an example is shown. The active and exact solution by using adaptive real time control in the case of unknown variation of static loads is simulated on VIPRO platform developed at Institute of Solid Mechanics of Romanian Academy. (27 refs.)

Inspec controlled terms: manipulator dynamics - mechatronics - motion control - position control

Uncontrolled terms: vertical plane - static loads - counterweights - simple passive solution - approximate solution - active solution - exact solution - adaptive real time control - adaptive balancing - robots - mechatronic systems - mechatronic arms

Classification Code: C3120C Spatial variables control - C3390M Manipulators - E2230 Robot and manipulator mechanics

IPC Code: B25J - G05D3/00

Treatment: Practical (PRA)

Database: Inspec

21. **Finite Element Analysis of Spherical Ultrasonic Motor using Wire Stator**
Fulin Wang; Nishizawa, U.; Toyama, S. **Source:** *International Journal of Modeling and*

Optimization, v 8, n 2, 74-7, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.627; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Tokyo Univ. of Agric. & Technol., Koganei, Japan

Abstract: The authors are developing multi degree of freedom micro spherical ultrasonic motor using wire stator for endoscope. In the previous study, the authors investigated the driving characteristics by using a single spiral wire stator of 15 times model as experimental equipment. In this study, assuming the introduction of a vascular endoscope, the authors design a wire stator and perform a transient response analysis by the finite element method. It is aimed to investigate the influence of the attenuation of the traveling wave transmitted on the wire stator by changing the condition of the model by this analysis. In the future, the authors will measure the amplitude of the wire stator by experiment and verify the accuracy of the simulation. (7 refs.)

Inspec controlled terms: endoscopes - finite element analysis - stators - transient response - ultrasonic motors

Uncontrolled terms: finite element analysis - spherical ultrasonic motor - freedom microspherical ultrasonic motor - single spiral wire stator

Classification Code: A0260 Numerical approximation and analysis - A8770E Patient diagnostic methods and instrumentation - B0290T Finite element analysis - B8340C Piezoelectric motors - E0210L Numerical analysis

IPC Code: A61B1/00 - G01N33/48 - H02K1/12 - H02N2/10

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

22. **Research on the realization of anatomical models by additive technologies**
Daniel, B.; Edgar, M.; Octavian, D.; Victor, C.; Alina, S.; Robert, C. **Source:** *International Journal of Modeling and Optimization*, v 8, n 4, 208-11, Aug. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.651; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Politeh. Univ. of Bucharest, Bucharest, Romania

Abstract: The paper presents experimental research on the realization of anatomical models using additive technologies using PLA (polylactic acid) material. Prototypes of human internal organs, cerebellum, brainstem, heart, maxillary dental arcade have been obtained, highlighting the advantages and benefits of RP technologies in medicine, especially in surgery and orthopedics by improving communication between doctors and patients, the latter understanding better diagnosis and surgical treatments using physical models printed through 3D technologies or for preparing surgical procedures. (6 refs.)

Inspec controlled terms: biological organs - biomechanics - biomedical equipment - dentistry - medical computing - medical image processing - orthopaedics - prosthetics - rapid prototyping (industrial) - surgery

Uncontrolled terms: physical models - anatomical models - additive technologies - experimental research - PLA material - polylactic acid - human internal organs - maxillary

dental arcade - benefits - RP technologies

Classification Code: A8770E Patient diagnostic methods and instrumentation - A8770G Patient care and treatment - A8770J Prosthetics and other practical applications - B7520 Patient care and treatment - B7520E Prosthetics and orthotics - B6135 Optical, image and video signal processing - C7330 Biology and medical computing - C5260B Computer vision and image processing techniques

IPC Code: A61B17/00 - A61C - A61F2/02 - A61F5/00 - G01N33/48 - G06F19/00 - G06T

Treatment: Practical (PRA)

Database: Inspec

23. **Analytical Model to Profile the Hob Mill for Generating Quadrilobed Pump Rotor**
Frumus¸anu, G.; Oancea, N. **Source:** *International Journal of Modeling and Optimization*, v 8, n 2, 82-6, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.629; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Manuf. Eng. Dept., Dunarea de Jos Univ. of Galati, Galati, Romania

Abstract: This paper presents a newly developed analytical model with application in profiling the hob mill for generating a pump rotor having four circular lobes with rectilinear directrix. The analytical model of rotor surface is deducted at first. The generating rack-tool is secondly determined and then, the peripheral surface of the hob mill results as envelop of surfaces family generated by the successive positions of generating rack-tool. The profiling solution lies on the fundamental theorems concerning the reciprocal enwrapped surfaces. A calculus algorithm and a numerical model developed in MatLab are proposed. The characteristic curve of hob mill tooth surface is found out in the case of a given rotor profile. (9 refs.)

Inspec controlled terms: gears - geometry - mechanical engineering computing - pumps - rotors

Uncontrolled terms: generating quadrilobed pump rotor - newly developed analytical model - circular lobes - rectilinear directrix - rotor surface - generating rack-tool - peripheral surface - hob mill results - profiling solution - reciprocal enwrapped surfaces - numerical model - hob mill tooth surface - given rotor profile

Classification Code: C7440 Civil and mechanical engineering computing - C4130 Interpolation and function approximation (numerical analysis) - E2200 Mechanical components, systems and devices - E2210 Mechanical components - E3638 Machinery and equipment industry - E0210E Combinatorial mathematics - E0210L Numerical analysis - E0410H Mechanical engineering applications of IT - E1520A Machining - E1560 Production equipment

IPC Code: F04 - F16H - H02K1/22

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

24. **Towards Use of Fiber Bragg Grating Sensors for Structural Health Monitoring of (aero) Space Structures**
Tudose, M.; Enciu, D.; Ursu, I. **Source:** *International Journal of Modeling and Optimization*, v 8, n 4, 246-9, Aug. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.659; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Nat. Inst. for Aerosp. Res. “Elie Carafoli” - INCAS, Bucharest, Romania

Abstract: In the present paper is made a state-of-the-art of Fiber Brag Grating sensors in R&D domain. Moreover, a test protocol and experimental measurements using optical fibers are developed. First of all, free FBG (not bonded on the substrate) were studied to determine the sensitivity to temperature variations. It has been found that the Bragg wavelength has a linear variation with temperature. This variation is due both to the strain generated as a result of the expansion of the optical fiber component (glass) and to the change in the refractive index of the glass with the temperature. Next, the measurements were done with sensors bonded to the aluminium substrate and subjected to different scenarios of temperature and/or mechanical deformations. The results show the variation of the Bragg wavelength of the optical fiber with respect to the applied load and the temperature of the substrate to which it was bonded. These experimental researches have been made as a first step for Structural Health Monitoring applications in the field of (aero)space structures. (12 refs.)

Inspec controlled terms: Bragg gratings - fibre optic sensors - optical fibres - refractive index

Uncontrolled terms: linear variation - temperature variations - free FBG - experimental measurements - test protocol - Fiber Brag Grating sensors - state-of-the-art - Fiber Bragg Grating sensors - (aero)space structures - Structural Health Monitoring applications - experimental researches - Bragg wavelength - aluminium substrate - optical fiber component

Classification Code: A4280F Gratings, echelles - A4281P Fibre optic sensors; fibre gyros - A4225G Edge and boundary effects; optical reflection and refraction - A4240E Holographic optical elements; holographic gratings - B7230E Fibre optic sensors - B4125 Fibre optics

IPC Code: G02B5/18 - G03H

Treatment: Practical (PRA); Experimental (EXP)

Database: Inspec

25. **Multi-objective Optimization in Power Systems Including UPFC Controller with NSGA III**
Merah, A.; Adjabi, M. **Source:** *International Journal of Modeling and Optimization*, v 8, n 6, 318-25, Dec. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.672; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Electromech. Syst. Res. Lab. (LSELM), Badji Mokhtar Univ., Annaba, Algeria

Abstract: In this paper, the third Version of Non-dominated Sorting Genetic Algorithm (NSGA III) inspired by nature is presented and used for the problem of optimal power flow (OPF) in power systems with a unified power flow controller (UPFC). The total cost of production,

emission and active loss in a power system with the UPFC that sets the load bus voltage and controls the power transits across the transmission line are minimized and validated optimally with the use of NSGA III. The NSGA III algorithm is an extension of NSGA I and II that is based on natural selection, it is also recently proposed multi-objective optimization (MOO) algorithms. The performances of NSGA III have been tested and verified on the IEEE 30-bus power system by comparing them to several other methods multi objective particle swarm optimization (MOPSO) and Strength Pareto Evolutionary Algorithm (SPEA II). In addition, NSGA III are used not only to optimize contradictory objectives such as total production cost, emission and active power losses, but also to improve the voltage profile of the power system. Our results illustrate that NSGA III can be used successfully to solve non-linear power system problems in the presence of UPFC, the most powerful and dynamic device of the third generation of the FACTS family. (13 refs.)

Inspec controlled terms: evolutionary computation - flexible AC transmission systems - genetic algorithms - load flow control - Pareto optimisation - particle swarm optimisation - power transmission economics - power transmission lines - voltage control

Uncontrolled terms: FACTS - SPEA II - strength pareto evolutionary algorithm - MOPSO - MOO algorithms - transmission line - load bus voltage - IEEE 30-bus power system - multiobjective optimization algorithms - NSGA III algorithm - unified power flow controller - optimal power flow - nondominated sorting genetic algorithm - UPFC controller - dynamic device - nonlinear power system problems - multiobjective particle swarm optimization

Classification Code: B8110C Power system control - B8120E a.c. transmission - B8130 Power transmission lines and cables - B0260 Optimisation techniques - B8110B Power system management, operation and economics - C3340H Control of electric power systems - C1180 Optimisation techniques - C3110B Voltage control

IPC Code: G05F - H01B9/00 - H02J3/00

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

26. **Upper Central Incisor Orthodontic Movement Approximation through Mathematical Simulation Programs**
Olimpia, B.; Muresan, V.; Colosi, T. **Source:** *International Journal of Modeling and Optimization*, v 8, n 6, 306-10, Dec. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.669; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Dept. of Autom., Tech. Univ. of Cluj-Napoca, Cluj-Napoca, Romania

Abstract: Orthodontic tooth movement is strictly dependent on force application point. In relation to this point, the Resistance center and Rotation center notions, express the obtained tooth movement and its' biological implications. There for, a certain resistance of the supporting tooth tissues, can ease or make mode difficult a bodily tooth movement. The proposed model, presents, based on two programs in a series sequence, an accessible variant of orthodontic tooth movement, with the possibility of initial data adaptation in order to obtain a numerical simulation and analogical modeling of the orthodontic movement of a wide dental dimensional category. (27 refs.)

Inspec controlled terms: biomechanics - dentistry - force - orthotics

Uncontrolled terms: upper central incisor orthodontic movement approximation - mathematical simulation programs - orthodontic tooth movement - force application point - Resistance center - Rotation center notions - supporting tooth tissues - bodily tooth movement

Classification Code: A8745B Mechanical properties of tissues and organs - A0260 Numerical approximation and analysis - A8770E Patient diagnostic methods and instrumentation - A8770J Prosthetics and other practical applications - A8770M Biomedical materials - B7520E Prosthetics and orthotics - C7330 Biology and medical computing

IPC Code: A61C - A61F5/00 - G01N33/48 - G06F19/00

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

27. **Enterprise Asset Management as a Flow Machine**
Al-Fedaghi, S.; Al-Huwais, N. **Source:** *International Journal of Modeling and Optimization*, v 8, n 5, 48-58, Oct. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.667; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Comput. Eng. Dept., Kuwait Univ., Safat, Kuwait

Abstract: Enterprise Asset Management (EAM) is a broad term for software that provides a way to view company-owned assets holistically, where the goal is to control and proactively optimize operations for quality and efficiency. According to some published literature, knowledge is currently lacking regarding how to model EAM processes so they can be made ready for computerized deployment. This paper applies a new modeling technique built on systems of things that flow, to model EAM processes systematically. This flow-based modeling method is applied to a case study in a real enterprise that uses IBM Maximo. The resulting model points in a promising direction for EAM. (22 refs.)

Inspec controlled terms: asset management - business data processing - maintenance engineering - mining industry - optimisation - production engineering computing - production management

Uncontrolled terms: EAM processes - flow-based modeling method - resulting model points - enterprise Asset Management - flow machine - Enterprise Asset Management - broad term

Classification Code: C7480 Production engineering computing - C7100 Business and administrative computing - E0410D Industrial applications of IT - E3020 Mining, oil drilling and natural gas industries - E1010 Production management

IPC Code: E21C - G06Q10/00

Treatment: Practical (PRA)

Database: Inspec

28. **Improvement of synchronization algorithms in home position for robots with 5 degrees of mobility**
Mihai, N. **Source:** *International Journal of Modeling and Optimization*, v 8, n 4, 217-21, Aug. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.653; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Technoaccord Inc., Laval, QC, Canada

Abstract: This paper will present a method to improve spatial trajectories errors for end effectors of any robot using combined two solutions of home positions functions. The paper will present the magnitude of the errors in different situations, using different synchronization and zeroing systems and their influence on positioning precision of the end effectors on the spatial trajectory. There will also be presented the results of experimental research measured in the laboratory on the ceiling mounted robot at various points of the trajectory and the influence of positional errors on the calculation algorithms for all five degrees of mobility. (10 refs.)

Inspec controlled terms: end effectors - position control - synchronisation

Uncontrolled terms: synchronization algorithms - home position - robots - spatial trajectories errors - end effectors - combined two solutions - home positions functions - different situations - different synchronization - zeroing systems - positioning precision - spatial trajectory - experimental research - positional errors - calculation algorithms

Classification Code: C3120C Spatial variables control - C3390M Manipulators - E2230 Robot and manipulator mechanics

IPC Code: B25J - G05D3/00

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

29. **Identification of the Transverse Distributed Load in the Euler-Bernoulli Beam Equation from Boundary Measurement**
Saraç, Y.; S¸ener, S.S. **Source:** *International Journal of Modeling and Optimization*, v 8, n 1, 13-16, Feb. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.617; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Dept. of Math., Ataturk Univ., Erzurum, Turkey

Abstract: This paper is concerned with an optimal control problem for the Euler-Bernoulli beam equation. We assume that the transverse distributed load is a control function. We prove the existence of the unique optimal solution in the suitable set of admissible control. We get the gradient of the cost functional by using the adjoint problem. (13 refs.)

Inspec controlled terms: beams (structures) - optimal control - optimisation - telecommunication congestion control

Uncontrolled terms: transverse distributed load - Euler-Bernoulli beam equation - boundary measurement - optimal control problem - control function - unique optimal solution - admissible control

Classification Code: A0260 Numerical approximation and analysis - A0230 Function theory, analysis - C1330 Optimal control - C1180 Optimisation techniques - E2110A General shapes and structures

Treatment: Theoretical or Mathematical (THR)

Database: Inspec

30. **Calibration of the underwater coordinate measuring machine using multi-joint link**
Shimono, S.; Nishizawa, U.; Toyama, S. **Source:** *International Journal of Modeling and Optimization*, v 8, n 4, 222-6, Aug. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.654; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Q.I Inc., Yokohama, Japan
Tokyo Univ. of Agric. & Technol., Koganei, Japan

Abstract: In this paper, the calibration of the multi-joint serial link for underwater coordinate measuring machine is conducted. The underwater coordinate measuring machine is an underwater positioning system which consists of underwater robot and multi-joint link. The link connected underwater robot from the water surface. The position of the robot is obtained from kinematics of the multi-joint link. The geometric calibration of the experimental model of the multi-joint link is conducted at the water tank and atmosphere to evaluate its measurement accuracy. The calibration result indicate that the positioning accuracy of the experimental model at the underwater is better than atmosphere and its standard deviation is 0.59 mm is obtained. (7 refs.)

Inspec controlled terms: calibration - coordinate measuring machines - mobile robots - position control - robot kinematics

Uncontrolled terms: multi-joint serial link - underwater robot - underwater positioning system - underwater coordinate measuring machine

Classification Code: C3390C Mobile robots - C3120C Spatial variables control

IPC Code: G01B5/008 - G05D1/00 - G05D3/00

Treatment: Practical (PRA)

Database: Inspec

31. **Assisted Research of some Dynamic Behavior Robots Parameters**
Olaru, A.D.; Olaru, S.A.; Mihai, N.C.; Smidova, N.M. **Source:** *International Journal of Modeling and Optimization*, v 8, n 2, 106-11, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.633; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Univ. Politeh. of Bucharest, Bucharest, Romania
RomSys SA, Bucharest, Romania
TechnoAccord SA, Quebec City, QC, Canada

Kosice Univ. of Technol., Kosice, Slovakia

Abstract: Optimization in Robotics is one of the most important problem to be solved because for that will be possible to obtain the best results to control the space trajectory, to control the vibration with final goal to obtain the extreme precision and stability. In the paper are shown the research of some dynamic behavior parameters like global dynamic transmissibility (GDT), global dynamic compliance (GDC) and damper's transfer function (DTF). All the assisted research were made by using the virtual LabVIEW data acquisition instrumentation and the acquisition board from National Instruments, USA. The applied method solves one small part of the complex problems of the optimisation in robotics. (58 refs.)

Inspec controlled terms: data acquisition - optimisation - robots - stability - trajectory control - vibration control - virtual instrumentation

Uncontrolled terms: dynamic behavior robot parameters - optimization - space trajectory control - vibration control - global dynamic transmissibility - GDT - global dynamic complianc - GDC - DTF - damper transfer function - National Instruments - USA - virtual LabVIEW data acquisition instrumentation - stability

Classification Code: C3390 Robotics - C7410H Computerised instrumentation - C1320 Stability in control theory - C3120C Spatial variables control - C3120F Mechanical variables control - C3210G Data acquisition systems for control

IPC Code: F16F - F16F15/00 - G05D3/00 - G05D19/00

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

32. **Human Motion Generative Model Using Variational Autoencoder**
Motegi, Y.; Hijioka, Y.; Murakami, M. **Source:** *International Journal of Modeling and Optimization*, v 8, n 1, 8-12, Feb. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.616; **Publisher:** IACSIT Press, Singapore

Author affiliation:
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Grad. Sch. of Sci. & Eng., Toyo Univ., Saitama, Japan

Abstract: We present a technique to learn large human motion data captured with optical motion capture system, represent it in a low dimensional latent space, so as to generate natural and various human motions from it. To extract human motion features we use a convolutional autoencoder, and to represent the extracted features as a probability density function in a latent space we use a variational autoencoder. Motion generator is modeled as a map from a latent variable sampled in the latent space to a motion capture data. We stack the convolutional decoder on top of the variational decoder, which can sample a latent variable and produce a motion. As a result, our system can generate natural and various human motions from a 32-dimensional latent space. (10 refs.)

Inspec controlled terms: feature extraction - image motion analysis - learning (artificial intelligence) - probability

Uncontrolled terms: human motion generative model - variational autoencoder - human motion data - optical motion capture system - low dimensional latent space - natural

motions - various human motions - human motion features - convolutional autoencoder - motion generator - motion capture data - variational decoder - 32-dimensional latent space

Classification Code: B6135E Image recognition - B0240Z Other topics in statistics - B6135 Optical, image and video signal processing - C5260B Computer vision and image processing techniques - C6170K Knowledge engineering techniques - C1140Z Other topics in statistics

IPC Code: G06F15/18 - G06T - G06T7/20 - G06N5/04

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

33. **Behavioral Stock Portfolio Optimization through Short-Selling**
Kuo-Hwa Chang; Young, M.N.; Chien-Chih Liu; Hao-Ping Chung **Source:** *International Journal of Modeling and Optimization*, v 8, n 2, 125-30, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.636; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Dept. of Ind. & Syst. Eng., Chung Yuan Christian Univ., Taoyuan, Taiwan

Abstract: With the introduction of behavioral stocks (B-stocks), investors now have an alternative profitable investment option by exploiting the positive effect (positive cumulative abnormal return CAR) of irrational behaviors to stock price movements. Currently, all work on B-stocks only consider the cause-and-effect relations that expect B-stocks to have positive CARs after some time following the spotting of their respective causes. Thus, this study finds the other side and exploits the cause-and-effect relations that expect B-stocks to have negative CARs after some time following the spotting of their respective causes. We call this short-sell B-stocks. Accordingly, this study proposes a scenario-based mixed integer program that considers the short-selling of B-stocks under the inverse version of the safety-first portfolio selection model to maximize the negative price change of B-stocks within the portfolio. The result shows that the short-sell portfolio can outperform the market portfolio significantly; this also indicates that the proposed investment strategy can be another alternative profitable investment option that investors can exploit. (12 refs.)

Inspec controlled terms: integer programming - investment - pricing - profitability - stock markets

Uncontrolled terms: B-stocks - short-sell portfolio - behavioral stock portfolio optimization - positive cumulative abnormal return CAR - cause-and-effect relations - profitable investment option

Classification Code: C1290D Systems theory applications in economics and business - C1180 Optimisation techniques

IPC Code: G06Q40/04

Treatment: Theoretical or Mathematical (THR)

Database: Inspec

34.

Numerical Simulation on Spatial Curves for Distributed Parameter Propagation Processes
Mures¸an, V.; Clitan, I.; Colos¸i, T.; Abrudean, M.; Ungures¸an, M.-L.; Clitan, A. **Source:** *International Journal of Modeling and Optimization*, v 8, n 4, 202-7, Aug. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.650; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Tech. Univ. of Cluj-Napoca, Cluj-Napoca, Romania

Abstract: The paper is referring to distributed parameter propagation phenomena, in relation to the Cartesian coordinate axes (0p;0q;0r). The analogical model of the propagation phenomenon is expressed through a partial differential equation of second (II) order, associated to each coordinate axis. The numerical integration is based on the matrix of partial derivatives of the state vector (M_{pdx}), that uses approximating solutions for the calculations start. The numerical simulation of the propagation phenomenon follows parametrical spatial curves predetermined in relation to time (t), respectively p = p(t), q = q(t), and r = r(t), in the period $t_0 \leqslant t \leqslant t_f$. The examples run on the computer are referring to identical or different propagation parameters in relation to the three Cartesian coordinate axes. The numerical simulation evolves after spatial curves in form of a spiral, which encloses significantly the evolution of the studied phenomenon. Some references are made on the applicability of the elaborated programs, for chemical, metallurgical, pollution processes etc. (9 refs.)

Inspec controlled terms: integration - numerical analysis - partial differential equations

Uncontrolled terms: propagation parameters - Cartesian coordinate axes - parametrical spatial curves - partial derivatives - numerical integration - coordinate axis - partial differential equation - propagation phenomenon - analogical model - distributed parameter propagation phenomena - distributed parameter propagation processes

Classification Code: A0260 Numerical approximation and analysis - A0230 Function theory, analysis - B0290P Differential equations (numerical analysis) - C4170 Differential equations (numerical analysis) - E0210L Numerical analysis

Treatment: Theoretical or Mathematical (THR)

Database: Inspec

35. **An agent based-model and equilibrium analysis of academic P&T decisions: the effects of inbreeding**
Das, S. **Source:** *International Journal of Modeling and Optimization*, v 8, n 5, 254-9, Oct. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.661; **Publisher:** IACSIT Press, Singapore

Author affiliation:
ECE Dept., Kansas State Univ., Manhattan, KS, United States

Abstract: In academic institutions, merit based promotion & tenure decisions have always been beset with controversy. This paper suggests an agent based model of the decision making process using spectral graph theory, where the voting agents are the vertices of the graph, and edge weights are determined based on the extent of collaborative research between the agents, as well as their estimated levels of social interactions. The model assumes that agents with lower research productivities tend to interact more often with one another. Using the graph theoretic spectrum, the paper applies a multidimensional representation that maps the voting agents into points on a low-dimensional grid, where agents that are likely to influence each other more are closely spaced. A multi-agent system model is proposed, where votes are determined based on

very small randomly assigned initial values, and the mutual interaction during the decision making process. The model incorporates limited collusive voting within academically inbred agents. The proposed model is able to accurately reproduce a known promotion decision making from a department of a research oriented university which involved a sizable number of voting agents with low research output. (20 refs.)

Inspec controlled terms: decision making - educational institutions - graph theory - multi-agent systems - publishing - research and development - social sciences

Uncontrolled terms: tenure decisions - merit based promotion - promotion decision making - academically inbred agents - decision making process - multiagent system model - graph theoretic spectrum - research productivities - voting agents - spectral graph theory - agent based model - academic institutions - academic P&T decisions - agent based-model

Classification Code: C7810 Social and behavioural sciences computing - C1160 Combinatorial mathematics - C6170 Expert systems and other AI software and techniques

IPC Code: G06F15/18

Treatment: Practical (PRA)

Database: Inspec

36. **Aeroelastic Analysis of an Aircraft Wing Type NACA 4412 with Reduced Scale**
Halima, Z.; Djilali, B. **Source:** *International Journal of Modeling and Optimization*, v 8, n 4, 241-5, Aug. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.658; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Mech. Eng. Dept., Univ. of Sci. & Technol. of Oran - Mohamed Boudiaf, Algeria

Abstract: This article addresses the problem of a flutter phenomenon and aeroelastic stability of a typical section airplane wing NACA 4412. The flutter is a dangerous phenomenon which finishes in general by the breaking of the plane, it can be determined as a dynamic instability of the structure. Flutter appears as a result of an interaction of aerodynamic, elastic and inertial forces, it occurs at a determined flight speed which is called the critical speed of the flutter. The objective of our study is to calculate the critical speed of flutter by a numerical simulation using the computer code ANSYS CFX 14.0 then the results are validated by testing with a slice wing on a subsonic wind tunnel. The experimental results are similar to those obtained by the numerical approach. (8 refs.)

Inspec controlled terms: aerodynamics - aerospace components - aircraft - computational fluid dynamics - elasticity - mechanical stability - numerical analysis - subsonic flow - wind tunnels

Uncontrolled terms: slice wing - aeroelastic analysis - aircraft wing type NACA 4412 - reduced scale - flutter phenomenon - aeroelastic stability - typical section airplane wing NACA 4412 - dangerous phenomenon - dynamic instability - aerodynamic forces - elastic forces - inertial forces - determined flight speed - critical speed

Classification Code: A4785 Applied fluid mechanics - A0260 Numerical approximation and analysis - A4710 General fluid dynamics theory, simulation and other computational methods - E2130 Fluid mechanics and aerodynamics (mechanical engineering) - E2210 Mechanical

components - E0210L Numerical analysis

IPC Code: B64C - F15D

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

37. **Simulation Study of a Futsal Ball Deformation in Normal Impact Using Finite Element Method**
Dattu, F.H.P.A.A.; Shazali, S.T.S.; Andrew-Munot, M.; Aizuddin, A.M.; Mohtar, A.M.; Bin Noor Mohamed, N.H. **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 188-92, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.647; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Fac. of Eng., Univ. Malaysia Sarawak, Kota Samarahan, Malaysia

Abstract: The popularity of the futsal games has gradually increased since it was introduced in Uruguay. Since that, the futsal games became a medium for the young players to train to be professional footballers. Many coaches are avoiding heading tactic until they are 12 years of age. This technique can lead into the potential cause of traumatic brain injury. To date there has been no study to predict the deformation of the futsal ball in normal impact on flat surface at low speeds. The purpose of this study is to investigate the deformation behavior of the futsal ball upon impact. The free fall drop test is performed on the futsal ball size 4 when hitting a rigid target at different heights 500mm, 1,000mm, and 1,500mm. The result shows that, the higher ball drop, the higher deformation of the ball. Then, a finite element model (FEM) of a futsal ball was constructed and the simulation of the ball analysis was done by comparison between two materials, which were Butyl Rubber (IIR) and Latex Rubber (NR). The results show that, the Butyl Rubber is the better material for futsal ball construction, as there are less deformation and stress which is in allowable stress. However, further improvement needs to be done by taking into consideration of the futsal ball under large deformation as well as at a high impact. (18 refs.)

Inspec controlled terms: deformation - finite element analysis - impact (mechanical) - impact testing - injuries - rubber - sport - stress analysis

Uncontrolled terms: allowable stress - latex rubber - butyl rubber - free fall drop test - traumatic brain injury - heading tactics - finite element method - futsal games - normal impact - futsal ball deformation - size 500.0 mm - size 1500.0 mm - size 1000.0 mm

Classification Code: E1710 Engineering materials - E1630 Testing - E2180F Ballistics and mechanical impact (mechanical engineering) - E3050 Service industries - E0210L Numerical analysis

IPC Code: G01N3/30

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

38.

Application of constructal theory to write mechanical maximum work principle and equilibrium state of continuum media flow as a solution of a variational optimization problem

Gavrus, A. **Source:** *International Journal of Modeling and Optimization*, v 8, n 4, 227-31, Aug. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.655; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Nat. Inst. of Appl. Sci. of Rennes, Rennes, France

Abstract: This scientific research proposes a fundamental application of constructal theory developed by prof. Adrian BEJAN of Duke University in order to prove in a mathematical sense that the mechanical maximum work principle used by the theory of continuum media plasticity can be regarded as a solution of a general variational optimization problem. According to the first and second thermodynamics laws, the constructal principle search to complete the natural tendency for all finite-size system to raise the entropy obtaining specific optimal system design or material flow configurations. In accord with the constructal theory "all system searches to flow more and more easily over time using specific distribution of imperfections in order to maximize entropy and to minimize the losses". In this sense, concerning the field of forming processes, all material flows under specified boundaries, loading and processing conditions are those which minimize the sum of dissipated deformation and friction power. Thus all the corresponding mechanical variables (velocities, stress, strain, strain rate) of the real mechanical state as those that minimizes the total dissipated power. It can be then obtained a variational constrained minimization problem. Equivalent form of the maximum work principle is proved also for the friction stresses together with the convexity properties of plastic or friction potential. An application in the case of a cylindrical upsetting shows the feasibility of the proposed minimization problem formulation to find analytical solution. To valid this theory, comparisons are made using the classical analytical analysis based on upper and lower bound theorems, slices method and numerical Finite Element Modelling (FEM). (8 refs.)

Inspec controlled terms: entropy - finite element analysis - forming processes - friction - minimisation - optimisation - plasticity - variational techniques

Uncontrolled terms: equilibrium state - continuum media flow - fundamental application - constructal theory - mathematical sense - mechanical maximum work principle - continuum media plasticity - general variational optimization problem - constructal principle search - finite-size system - specific optimal system design - corresponding mechanical variables - mechanical state - variational constrained minimization problem - minimization problem formulation - analytical solution

Classification Code: A0260 Numerical approximation and analysis - A6220F Deformation and plasticity - B0260 Optimisation techniques - C1180 Optimisation techniques - E0210L Numerical analysis - E1520G Forming processes

Treatment: Theoretical or Mathematical (THR)

Database: Inspec

39. **Numerical Method for the Kinematic Analysis of the Spatial Multi-Link Mechanisms**
Alexandru, C. **Source:** *International Journal of Modeling and Optimization*, v 8, n 2, 101-5, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.632; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Mechatron. & Environ. Dept., Transilvania Univ. of Brasov, Bras¸ov, Romania

Abstract: The work deals with a numerical method for the kinematic analysis of the spatial multi-link mechanical systems (linkages). According to the proposed method, three specific points determine the spatial position and orientation of the central element of the mechanism (i.e. the rod). The kinematic equations system contains the geometric constraint equations and the rigid body conditions of the rod (i.e. constant distances between the three specific points). The corresponding non-linear system is solved by using the Newton-Kantorovich approach. The case study is developed by considering a complex wheel guiding mechanism used for vehicle suspension system. (15 refs.)

Inspec controlled terms: design engineering - kinematics - mechanical contact - mobile robots - Newton method - robot dynamics - rods (structures) - suspensions (mechanical components) - vehicle dynamics - wheels

Uncontrolled terms: specific points - spatial position - central element - rod - kinematic equations system - geometric constraint equations - rigid body conditions - nonlinear system - complex wheel guiding mechanism - vehicle suspension system - numerical method - kinematic analysis - spatial multilink mechanisms - spatial multilink mechanical systems

Classification Code: A0260 Numerical approximation and analysis - C5260B Computer vision and image processing techniques - C3390C Mobile robots - E2210 Mechanical components - E2220 Vehicle mechanics - E2230 Robot and manipulator mechanics - E0210L Numerical analysis - E1400 Design

IPC Code: B60B - B60G - G05D1/00 - G06T

Treatment: Theoretical or Mathematical (THR)

Database: Inspec

40. **Modelling and Simulation of Ageing on Performance of Assembly Workers through a Learning Curve**
Abubakar, M.I.; Qian Wang **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 183-7, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.646; **Publisher:** IACSIT Press, Singapore

Author affiliation:
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Abstract: In the past decade, the manufacturing environment has faced more challenges than ever since as a result of the increase of global competiveness and preferences of customer demands, which require developments of a resilient production system that is capable of providing essential flexibility and responsiveness to accommodate changes at an unpredictable circumstance. Human centred assembly systems, as an example, can offer such characteristics because of the nature of human intelligence and problem solving abilities. Nevertheless, human performance on a human centred assembly system is also largely affected by human factors during production. Ageing is one of human factors that may significantly affect human performance in completing assigned assembly tasks. When designing and analysing a human centred manufacturing system, such a human attribute is often inadequately represented in neither mathematical models nor computer-based simulation models and therefore the analysed

outcomes using these approaches may not properly describe the real behaviour of the system. The result of the previous studies also indicates that human performance may start to decline from the age of 38 years old and beyond. This paper presents a study by investigating the influence of ageing on assembly worker performance using a learning curve approach. The different ageing cohorts were incorporated into a DES (discrete event simulation) model. The study concludes that worker productivity decreases by an average 1% per year as the age of workers increases from 38 to 70 years old. (38 refs.)

Inspec controlled terms: assembling - discrete event simulation - human factors - personnel - production engineering computing - production management

Uncontrolled terms: assembly workers - resilient production system - human centred assembly system - human intelligence - problem solving abilities - human performance - human factors - ageing - assigned assembly tasks - human centred manufacturing system - human attribute - mathematical models nor computer-based simulation models - assembly worker performance - learning curve approach - DES model - worker productivity decreases - time 38.0 year to 70.0 year - time 38.0 year

Classification Code: C7480 Production engineering computing - E1010 Production management - E1520C Assembling - E0410D Industrial applications of IT

Treatment: Practical (PRA)

Database: Inspec

41. **Testing Platform for the Validation of Vertical Take-off and Vertical Landing (VTVL) Control Algorithms**
Toader, A.; Tecuceanu, G. **Source:** *International Journal of Modeling and Optimization*, v 8, n 4, 236-40, Aug. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.657; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Nat. Inst. for Aerosp. Res. "Elie Carafoli", Bucharest, Romania

Abstract: This paper presents preliminary results obtained during the development of a Vertical Take-Off and Vertical Landing (VTVL) demonstrator. The aim of this vehicle is to provide the experimenter with a testing platform for the validation of advanced control techniques related to reusable launchers and landers, and additionally for the assessment of visual navigation systems. (5 refs.)

Inspec controlled terms: aerospace control - aerospace navigation - aerospace testing - mobile robots - space vehicles

Uncontrolled terms: visual navigation systems - reusable launchers - reusable landers - vertical take-off and vertical landing demonstrator - vertical take-off and vertical landing control algorithms - advanced control techniques - VTVL - testing platform

Classification Code: B7650C Air traffic control and navigation - C3360L Aerospace control - C3390C Mobile robots

IPC Code: B64G1/00 - B64G1/24 - G01C21/00 - G05D1/00 - G08G5/00

Treatment: Practical (PRA); Experimental (EXP)

Database: Inspec

42. **Study Concerning Mechanical Behavior for 3D Printing Parts**
Daniel, B.; Rizescu, D.; Rizescu, C.I.; Constantin, V.; Alina, S.; Constanta, P.I. **Source:** *International Journal of Modeling and Optimization*, v 8, n 2, 112-15, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.634; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Politeh. Univ. of Bucharest, Bucharest, Romania

Abstract: The research was developed at University POLITEHNICA of Bucharest, Faculty of Mechanical Engineering and Mechatronics. There were several challenges regarding to technological aspects. In the paper is presented the manufacturing process by adding the material which uses the raw material in the solid state between three systems to print provided with one extruder and with two extruders. Also, there were considered different fill densities. For each printer, the workpieces were printed in horizontal position and vertical position. Thus, there were designed and printed a couple of physical models used in sporting activities, in accordance with the 3D models. There are presented some remarks about the quality for the two printing systems. (6 refs.)

Inspec controlled terms: design engineering - extrusion - mechanical properties - product quality - production equipment - raw materials - sport - three-dimensional printing

Uncontrolled terms: 3D printing parts - mechanical behavior - Politehnica University of Bucharest - Faculty of Mechanical Engineering and Mechatronics - printer position - design engineering - sporting activities - product quality - physical models - extruder - raw material - manufacturing process

Classification Code: E1520G Forming processes - E1560 Production equipment - E1610 Inspection and quality control - E1780 Products and commodities - E2180Z Other specific mechanical properties (mechanical engineering) - E1710 Engineering materials - E1400 Design

IPC Code: B21C23/00

Treatment: Practical (PRA)

Database: Inspec

43. **Sub-direction parallel search quasi-newton algorithm**
Wang Bao; Wang Yanxin **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 131-7, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.637; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Sch. of Sci., Ningbo Univ. of Technol., Ningbo, China

Abstract: Advantages and disadvantages in a sequence of unconstrained optimization method are basically compared. The original constrained problem is replaced by a sequence of unconstrained sub-problems through the augmented Lagrangian multiplier method. The unconstrained sub-problems are solved by BFGS method and the sub-direction parallel search

quasi-Newton algorithm. Efficiency of this method is compared. The results of numerical tests show that the calculation time of the sub-direction parallel search quasi-Newton algorithm is short and it can solve engineering optimization problems completely. (8 refs.)

Inspec controlled terms: Newton method - optimisation - parallel algorithms - search problems

Uncontrolled terms: unconstrained optimization method - augmented Lagrangian multiplier method - sub-direction parallel search quasiNewton algorithm - BFGS method

Classification Code: C4240P Parallel programming and algorithm theory - C1160 Combinatorial mathematics - C1180 Optimisation techniques - C4130 Interpolation and function approximation (numerical analysis)

Treatment: Theoretical or Mathematical (THR)

Database: Inspec

44. **Evaluation of Systematic Error and Uncertainty of Viscosity Measurements of Mixtures of Monoethanol Amine and Water in Coaxial Cylinder Rheometers**
Karunarathne, S.S.; Eimer, D.A.; Oslashi, L.E. **Source:** *International Journal of Modeling and Optimization*, v 8, n 5, 260-5, Oct. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.662; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Univ. of Southeast Norway, Norway

Abstract: In this study, the use of coaxial cylinder viscometer in viscosity measurements of monoethanol amine and water mixture is discussed. Random and systematic effects engage with the rheometer lead to deviate the measured quantity from its actual value. Compensation for the systematic effect is called as the bias and this compensation can not be done perfectly. The measurement uncertainty arises due to the lack of exact knowledge on what is being measured. Identification of uncertainty sources is vital in uncertainty analysis to evaluate the total uncertainty of a measuring technique. The calculated expanded (k=2) uncertainty of viscosity measurement of an alkanol amine and water mixture using a coaxial cylinder viscometer in this work is 0.0162 mPamiddots. Further, the viscosities of mixtures of monoethanol amine and water mixtures under temperature 20-130 degC are measured. This is the normal temperature range for a traditional amine based CO_2 capture process. Viscosity deviations are modeled according to Redlich-Kister type correlation and parameters are found through a regression analysis. (12 refs.)

Inspec controlled terms: liquid mixtures - measurement uncertainty - mixing - organic compounds - regression analysis - viscometers - viscosity - viscosity measurement

Uncontrolled terms: viscosity measurement - coaxial cylinder rheometers - coaxial cylinder viscometer - water mixture - rheometer lead - measurement uncertainty - uncertainty sources - uncertainty analysis - measuring technique - alkanol amine - traditional amine - viscosity deviations - systematic error - monoethanol amine mixture - CO_2 capture process - Redlich-Kister type correlation - regression analysis - CO_2

Classification Code: E1780 Products and commodities - E0210J Statistics - E1525 Industrial processes

IPC Code: B01F3/00

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

45. **Development of Stent Motor**
Toyama, S.; Nishizawa, U. **Source:** *International Journal of Modeling and Optimization*, v 8, n 2, 27-30, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.628; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Tokyo Univ. of Agric. & Technol., Koganei, Japan

Abstract: The purpose of this study is to develop a stent motor applicable for medical blood vessel treatment. The stent motor is a movable stent and it has functions of removing plaque and expanding blood vessels. It consists of two parts; ultrasonic receivers and vibration transmitting coil (stator). In this study, the authors have focused in the vibration analysis of the receiver. In the design stage, the authors have evaluated resonant phenomenon using finite element method. When applying it in water, the resonant frequency in the air is shifted due to mass effect of water around the receiver. Frequency response analysis of the receiver shows that extremely high precision of dimensions is required because the resonant frequency in water depends not only size but also the amplitude of the vibration. It is very difficult to design an optimal receivers resonating in water. In order to solve this problem, the authors have tried a new receiver with wide plate receiving ultrasound effectively and requiring no resonant. The authors have succeeded in driving this type of motor in water. (7 refs.)

Inspec controlled terms: blood vessels - cellular biophysics - coils - composite materials - finite element analysis - frequency response - plates (structures) - stators - stents - ultrasonic motors - vibrations

Uncontrolled terms: stent motor applicable - medical blood vessel treatment - movable stent - plaque - expanding blood vessels - ultrasonic receivers - vibration analysis - design stage - resonant phenomenon - finite element method - resonant frequency - response analysis - optimal receivers

Classification Code: A8770E Patient diagnostic methods and instrumentation - A8770G Patient care and treatment - A8770J Prosthetics and other practical applications - A0260 Numerical approximation and analysis - B7820 Sonic and ultrasonic applications - B8340C Piezoelectric motors - B0290T Finite element analysis - C7330 Biology and medical computing - E0210L Numerical analysis

IPC Code: A61F2/82 - G01N33/48 - G06F19/00 - H01F5/00 - H01F27/28 - H02K1/12 - H02N2/10

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

46. **3D Reconstruction of Simulated Vapor Cloud Explosion Triggered by Major Hazard Installation**
Wenjiang Chen; Yan Yong; Zhaoji Hu; Hongbo Su **Source:** *International Journal of Modeling*

and Optimization, v 8, n 5, 21-6, Oct. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.663; **Publisher:** IACSIT Press, Singapore

Author affiliation:
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Abstract: As one of the most frequently occurring accidents in a petrochemical enterprise, a vapor cloud explosion (VCE) is likely to occur when the vapor cloud is formed due to the leakage of a major hazard installation (MHI) storing massive flammable and explosive media. In particular, a VCE in the storage area of petrochemical enterprise may cause domino accidents if it is out of control. Considering the safety and economy of large-scale accident experiment, this paper proposes a three-dimensional (3D) reconstruction method to describe VCE triggered by MHI. The method describes 3D hazard characteristics of VCE based on the Netherlands Organization (TNO) multi-energy method. To enhance the sensing cognition of VCE, a 3D reconstruction system is developed based on the virtual reality (VR) idea. Finally, the system is applied in an actual petrochemical enterprise to simulate the dynamic effects and the consequences of VCE. The results show that the 3D reconstruction system is of lifelike and visual characteristics, which not only embodies the great practical application value of the VR technology in the field of safety engineering, but also provides references for safety management, disaster prediction, risk assessment, emergency response and safety planning of petrochemical enterprises. (19 refs.)

Inspec controlled terms: accident prevention - accidents - disasters - explosions - hazards - industrial accidents - occupational safety - petrochemicals - risk analysis - risk management - virtual reality

Uncontrolled terms: frequently occurring accidents - major hazard installation - simulated vapor cloud explosion triggered - actual petrochemical enterprise - 3D reconstruction system - Netherlands Organization multienergy method - 3D hazard characteristics - MHI - three-dimensional reconstruction method - large-scale accident experiment - domino accidents - VCE - explosive media - massive flammable media

Classification Code: C7450 Chemical engineering computing - C6130V Virtual reality - C0230 Economic, social and political aspects of computing - E0240H Health and safety aspects

IPC Code: F16P

Treatment: Practical (PRA)

Database: Inspec

47. **3D Process Simulation for Advanced Immersion Lithography**
Shijie Wang; Ying Lin; Keng Heng Lai; Tan, S.; Qun Ying Lin **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 193-6, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.648; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Inst. of Microelectron., A*STAR, Singapore, Singapore

Abstract: ArF immersion lithography has been widely adopted for advanced integrated circuits manufacturing since the 45nm technology node, and now is still one of the mainstream

patterning techniques for semiconductor mass production. In this paper, we reported comprehensive evaluation results of a full track tri-layer coating immersion process for 28nm/20nm technology node applications, which included tri-layer process setup and film stack thickness optimization, illumination selection for establishment of printing 45nm line/space (L/S) and 65nm contact hole (CH) patterns. By combination of simulation and experimental verifications, a manufacturable immersion process has been successfully set up and optimized to meet customers' requirements. (8 refs.)

Inspec controlled terms: coating techniques - immersion lithography - mass production - nanolithography - nanopatterning

Uncontrolled terms: CH patterns - contact hole patterns - line-space printing - illumination selection - full track tri-layer coating immersion process - mainstream patterning techniques - contact hole - technology node applications - comprehensive evaluation - advanced integrated circuit manufacturing - 3D process simulation - manufacturable immersion process - film stack thickness optimization - tri-layer process setup - semiconductor mass production - ArF immersion lithography - advanced immersion lithography - size 65.0 nm - size 45.0 nm - size 28.0 nm - size 20.0 nm - F

Classification Code: B2550G Lithography (semiconductor technology) - B2550N Nanometre-scale semiconductor fabrication technology

IPC Code: B82B3/00 - G03F7/00 - G03F7/20 - H01L21/02 - H01L21/70 - B82Y40/00

Treatment: Practical (PRA)

Database: Inspec

48. **Social Simulation for Analyzing Product Recall Systems Using Co-evolution Model Considering Consumers' Diverse Monetary Sense**
Watanabe, T.; Kanno, T.; Furuta, K. **Source:** *International Journal of Modeling and Optimization*, v 8, n 1, 46-54, Feb. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.623; **Publisher:** IACSIT Press, Singapore

Author affiliation:
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Dept. of Syst. Innovation, Univ. of Tokyo, Tokyo, Japan

Abstract: In recent years, accidents and product recalls caused by product defects have become major problems in numerous industries worldwide. However, most of existing research studying product recalls adopted empirical approaches. To improve product recall systems, we studied social simulation using a multi-agent system with co-evolution model. This research is important, because empirical approaches are no longer adequate for the complex and diverse modern society. Discussions using quantitative and predictive approaches, including agent-based simulation, are therefore expected. In this study, we propose a new model: Money Importance Factor, for considering consumers' diverse monetary sense. We conducted a simulation experiment, and we discovered the possibility that consumers are willing to buy more expensive and higher-quality products for preventing product accidents, when the products have a large risk of accidents apparently from their attributes. In addition, we have also found that it is important to make an impression or a recognition of product recalls better through improving social systems. We believe this work can contribute to supporting not only government staffs for improving product recall systems, but also executive officers of product companies for deliberating their strategy of recall decisions. (33 refs.)

Inspec controlled terms: accident prevention - consumer behaviour - decision making - evolutionary computation - financial management - multi-agent systems - product quality - social sciences - societies

Uncontrolled terms: evolutionary computation - government staffs - risk analysis - product accidents prevention - product quality - monetary - money importance factor - society - co-evolution model - consumer behaviour - product recall systems - recall decisions - product companies - agent-based simulation - multiagent system - social simulation - product defects

Classification Code: C6170 Expert systems and other AI software and techniques - C1180 Optimisation techniques - E1780 Products and commodities - E1610 Inspection and quality control - E0260 Social and political issues - E0210G Optimisation - E0120P Marketing and sales - E0120K Financial management

IPC Code: F16P - G06F15/18

Treatment: Practical (PRA); Theoretical or Mathematical (THR); Experimental (EXP)

Database: Inspec

49. **Apprenticeship Learning of Ship Behavior in Crowded Area by Dimension Compression**
Yuxin Liang; Mase, M. **Source:** *International Journal of Modeling and Optimization*, v 8, n 2, 87-94, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.630; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Hitachi, Ltd., Kokubunji, Japan

Abstract: There is a strong demand for autonomous ship navigation systems in maritime logistics. Such systems need to be able to forecast behaviors of other ships accurately to avoid collisions. Here, time-series of ship positions, called AIS data, can be used in apprenticeship learning (AL) by defining an object map created from the data as a state and the turning direction of the ship as an action. However, when we analyzed 1 months' worth of AIS data, none of the generated path data took actions in the same state pattern twice. This paper proposes to use a Co-Moving Frame (CMF), a local segment of the environment on a small timescale. CMF improved the effectiveness of the data usage, and as a result, AL forecast paths of ships with 81.2% accuracy when applying CMF. This result is 29.2% better than that of a state transition model generated from the same dataset without applying CMF. (16 refs.)

Inspec controlled terms: logistics - marine navigation - ships - time series - transportation

Uncontrolled terms: data usage - apprenticeship learning - ship behavior - crowded area - dimension compression - autonomous ship navigation systems - maritime logistics - time-series - ship positions - object map - generated path data - state pattern - AIS data - Co-Moving Frame - time 1.0 month

Classification Code: C1290H Systems theory applications in transportation - C1140Z Other topics in statistics

IPC Code: B63B - G01C21/00 - G08G3/00

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

50. **A Bayesian Approach for Analyzing the Dynamic Dependence of GDP on the Unemployment Rate in Japan**
Kyo, K.; Noda, H. **Source:** *International Journal of Modeling and Optimization*, v 8, n 1, 55-61, Feb. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.624; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Obihiro Univ. of Agric. & Veterinary Med., Obihiro, Japan
Tokyo Univ. of Sci., Tokyo, Japan

Abstract: Real gross domestic product (GDP) and unemployment rate (UR) are basic indicators of business conditions, which are correlated with each other. It is important to understand the dynamic relationship between quarterly GDP and monthly UR. To analyze this dynamic relationship, we propose a Bayesian regression method to estimate the dynamic dependence of a stationary component of GDP on a stationary component of UR. First, we extract the stationary components from the original time series for GDP and UR using a set of state space models. Then, we construct a set of Bayesian regression models, with each model having a time-varying coefficient. As an application of our proposed approach, we analyze the dynamic relationship between the stationary components of GDP and UR in Japan, using the separate URs for men and women. Overall, we find that the movements of UR lead those of GDP by a few months during expansion phases. In contrast, movements of the UR lag those of GDP by a few months during recession phases. Moreover, there is negative correlation between the stationary components of GDP and UR. Such negative correlation is stronger in the recession phase than in the expansion phase. We conclude that the UR can. (12 refs.)

Inspec controlled terms: Bayes methods - economic cycles - economic indicators - regression analysis - time series - unemployment

Uncontrolled terms: Japan - time series - Bayesian regression models - monthly UR - quarterly GDP - dynamic relationship - gross domestic product - unemployment rate - dynamic dependence - stationary component

Classification Code: C1290D Systems theory applications in economics and business - C1140Z Other topics in statistics

Treatment: Theoretical or Mathematical (THR)

Database: Inspec

51. **Solving a Modified TSP Problem by a Greedy Heuristic for Cost Minimization**
C¸al, M.; Ekici, A. **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 138-44, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.638; **Publisher:** IACSIT Press, Singapore

Author affiliation:
Tubitak Tusside, Turkey
Ozyegin Univ., Istanbul, Turkey

Abstract: Photographing a large area in an instant becomes hard if the area is very large like a rain forest or industrial territory. Therefore, more than one photograph is necessary to visualize the whole area. Agents such as drones are used for taking photographs. They take photographs at several points (nodes) to cover the area. In that sense, the problem may be defined as a variant of TSP. Photographs are able to cover multiple nodes if taken, so it is not practical to go to every node to take photos. Instead, several photos are taken in nodes at the minimum cost, and all nodes are covered. We make use of accessibility concept to incorporate this situation into our model. If several nodes are within the field of a particular node, drones can go to that node, take a photo at that node, and are able to cover all accessible neighbor nodes. In this study, we provide a unique mathematical model for this modified TSP, show that the problem is NP-Hard and provide a greedy heuristic to find solutions within 1-10% of the solutions and lower bounds on hand. We observe that if photographing costs are kept lower than distance costs, the algorithm yields 1-5% gap, and as the photographing costs increase, performance of the algorithm falls to around 5-10% gap. In all cases, we are able to solve problem instances within seconds to several minutes. Our model based on photographing and accessibility is unique as it involves accessibility based on distance and heights; and the heuristic we provide differs from previous ones in that it incorporates two different sub-heuristics in addition to SCP optimization algorithm. (36 refs.)

Inspec controlled terms: greedy algorithms - optimisation - travelling salesman problems

Uncontrolled terms: photographing costs - distance costs - modified TSP problem - greedy heuristic - cost minimization - SCP optimization algorithm - NP-hard problem

Classification Code: C1290 Applications of systems theory - C1160 Combinatorial mathematics - C1180 Optimisation techniques

Treatment: Theoretical or Mathematical (THR)

Database: Inspec

52. **Optimizing a Deep Learning Model in Order to Have a Robust Neural Network Topology**
Khan, R.U.; Kumar, R.; Khan, N.; Xiaosong Zhang; Ahad, I. **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 145-9, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.639; **Publisher:** IACSIT Press, Singapore

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Abstract: In this study, a method based on different feature engineering / feature extraction / feature derivation is proposed for improving air passenger forecasting by machine learning existing libraries. In this kind of formulation, we kept focus on creating different kinds of datasets that differ one from another by methodology so we extracted new features and compared new feature space with original feature space in terms of variable importance. We conducted experiments to improve the variance by aggregating all the features in final feature space. Finally, we optimized a deep learning model to have a Robust Neural Network Topology. (14 refs.)

Inspec controlled terms: convolutional neural nets - feature extraction - learning (artificial intelligence) - traffic engineering computing - transportation

Uncontrolled terms: feature engineering - robust neural network topology - feature extraction - feature derivation - air passenger forecasting - deep learning model

Classification Code: C7445 Traffic engineering computing - C5290 Neural computing techniques - C6130 Data handling techniques

IPC Code: G06F7/00 - G06N3/02

Treatment: Practical (PRA)

Database: Inspec

53. **Effects of reference price and collaborative product promotion on product innovation in supply chain**
Baojun Zhang; Shaojian Qu; Panpan Li **Source:** *International Journal of Modeling and Optimization*, v 8, n 5, 281-9, Oct. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.666; **Publisher:** IACSIT Press, Singapore

Author affiliation:
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Abstract: Modern products such as smart phones are quickly updated with limited innovation. However, the promotion level of these products is very high in the market. Literature has not adequately addressed this phenomenon above. This paper studies it from consumer behavior and the collaboration of the supply chain. The model of this paper integrates firms' innovation and promotion decisions in a two-tier supply chain, where a monopoly manufacturer sells products to end-customers through a distributor. The level of product renewal and the level of promotion are decided by the manufacturer and the dealer respectively. Research shows that, when the proportion of marginal revenue between the manufacturer and the distributor meets certain conditions, the game has a unique equilibrium. The manufacturer has the only optimal level of product innovation. In addition, if the manufacturer chooses the best participation rate with the distributor to carry out the product promotion, the profits of both sides are increased. We can see that the collaboration of the supply chain indirectly promotes the limited product updates. The conclusions of the study have some guiding significance for the product innovation and promotion. (30 refs.)

Inspec controlled terms: consumer behaviour - monopoly - pricing - profitability - supply chain management

Uncontrolled terms: collaborative product promotion - product innovation - modern products - promotion level - firms - promotion decisions - two-tier supply chain - monopoly manufacturer - distributor - product renewal - optimal level - product updates

Classification Code: C1290F Systems theory applications in industry - E1010 Production management - E1540 Systems theory applications

Treatment: Economic (ECO); Practical (PRA)

Database: Inspec

54. **Age Structural Model of Zika Virus**
Lamwong, J.; Pongsumpun, P. **Source:** *International Journal of Modeling and Optimization*, v

8, n 1, 19-23, Feb. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.618; **Publisher:** IACSIT Press, Singapore

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Abstract: Zika virus is mosquito-borne flavivirus. It can be transmitted between human by bitting of Aedes mosquitoes. It can also transmit chikungunya, yellow fever and dengue disease. Zika virus can spread through mosquito to human, human to mosquito and human to human. In this paper, we account the age structure of zika virus patiens. We divide into two groups: human and mosquito. Age structure of human population is separated two groups: juvenile and adult human. Standard dynamical modeling method is used for analyzing the behaviors of solutions. The stability conditions for the disease free and endemic equilibrium states are considered by RouthHurwitz criteria. We simulate our model by using numerical method. The numerical simulations are showed to confirm the analytical results. (9 refs.)

Inspec controlled terms: diseases - microorganisms - nonlinear dynamical systems - numerical analysis

Uncontrolled terms: age structural model - Aedes mosquitoes - yellow fever - dengue disease - mosquito - age structure - zika virus patiens - human population - juvenile human - adult human - standard dynamical modeling method

Classification Code: A8715B Biomolecular structure, configuration, conformation, and active sites - A8715M Interactions with radiations at the biomolecular level - A0547 Nonlinear dynamical systems and bifurcations - C1290L Systems theory applications in biology and medicine - C7330 Biology and medical computing

IPC Code: G06F19/00

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec

55. **A Model for National Electronic Identity Document and Authentication Mechanism Based on Blockchain**

Juan, M.D.; Andre´s, R.P.; Rafael, P.M.; Gustavo, R.E.; Manuel, P.C. **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 160-5, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.642; **Publisher:** IACSIT Press, Singapore

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Abstract: This paper proposes a security model for a national electronic Identity Document (e-ID) in Colombia, based on blockchain network concept using smart cards and taking advantage of the traditional authentication methods as biometry (citizen authentication) and physical security (document authentication), in order to reduce the security issues of the currently used Identity Document. The proposed model uses smart cards to store information of the citizen, such as the encrypted template of their biometric features in order to perform user authentication, fingerprint and iris recognition technologies. In addition, the well-known benefits of a private blockchain network are exploited to verify the authenticity of the document and validate the legality of the user transactions. The blockchain network architecture are also

presented defining the block structure, the type of transactions and the blockchain approach for the e-ID. (25 refs.)

Inspec controlled terms: authorisation - biometrics (access control) - cryptography - iris recognition - message authentication - security of data - smart cards

Uncontrolled terms: national electronic Identity Document - blockchain network concept - smart cards - taking advantage - traditional authentication methods - biometry - citizen authentication - physical security - document authentication - security issues - currently used Identity Document - user authentication - private blockchain network - authenticity - validate - blockchain network architecture - blockchain approach - authentication mechanism - security model

Classification Code: B6120D Cryptography - B6135E Image recognition - C6130S Data security - C5260B Computer vision and image processing techniques

IPC Code: G06F21/00 - G06K9/00 - G06K19/07 - G06T - H04L9/00 - H04L9/32 - G06Q20/34

Treatment: Practical (PRA)

Database: Inspec

56. **Ecosin-Mechatron Research Infrastructure - New Multi-Applied Smart and Multi-Applied Cyber - Mix Eco-Systems of Mechatronics in Romania in View of the Internationalization**
Gheorghe, G.I. **Source:** *International Journal of Modeling and Optimization*, v 8, n 2, 62-7, April 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.625; **Publisher:** IACSIT Press, Singapore

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Abstract: ECOSIN-MECHATRON integrates into major flexibility, national R & D institutes, technical and polytechnic universities and other companies, NGOs, innovative SMEs and catalysts for advanced smart areas such as Mechatronics and Micro Nano-Mechatronics, Cyber-Mix-Mechatronics, Smart Materials, Robotics and Micro-Nano-Robotics, Mechatronics for Agriculture (Agrotronics), Automotive Mechatronics (Autotronics), Mechatronics of the Industry 4.0 (Indutronics) and so on. In brief, the ECOSIN-MECHATRON project contributes to attaining the objectives of the National Strategy RDI 2020 in Romania and the Europe 2020 Strategy, respectively increasing the Romanian competitiveness and contribution to the knowledge programs, increasing the role of Mechatronics and Cyber-Mix-Mechatronics in Romania and Europe and increasing the level and efficiency of smart knowledge. (8 refs.)

Inspec controlled terms: innovation management - mechatronics - research and development

Uncontrolled terms: Romania - Smart Materials - micronanomechatronics - cyber-mix-mechatronics - NGO - polytechnic universities - technical universities - national R & D institutes - ECOSIN-MECHATRON research infrastructure - multiapplied smart-multiapplied cyber-mix eco-systems - automotive mechatronics - micronanorobotics

Classification Code: E1030 Research and development - E1400 Design - E1710 Engineering materials

Treatment: Practical (PRA)

Database: Inspec

57. **Network Distribution Model of Influenza Virus in the Community**
Pongsumpun, P. **Source:** *International Journal of Modeling and Optimization*, v 8, n 1, 30-2, Feb. 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.620; **Publisher:** IACSIT Press, Singapore

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Abstract: Influenza is occurred around the world. It caused by influenza virus. The types of influenza can affect people such as type A, B and C. The influenza virus can spread though the air from coughs or sneezes between people. It can be found in all age of human. In this study, we formulate the network model for the transmission of influenza virus. The numerical simulations are given to see the influence of each parameter.The mathematical method is used in this paper. The discussion of each parameter is given. (12 refs.)

Inspec controlled terms: biology computing - diseases - microorganisms

Uncontrolled terms: network distribution model - influenza virus - mathematical method - numerical simulations

Classification Code: C7330 Biology and medical computing

IPC Code: G06F19/00

Treatment: Practical (PRA)

Database: Inspec

58. **The Optimal Crane Scheduling for Chemical Polishing Process Based on Expert System**
Chi-Yen Shen; Wang, S.T.; Kaiqi Zhou; Hanlin Shen; Rey-Chue Hwang **Source:** *International Journal of Modeling and Optimization*, v 8, n 3, 166-71, June 2018; **ISSN:** 2010-3697; **DOI:** 10.7763/IJMO.2018.V8.643; **Publisher:** IACSIT Press, Singapore

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Abstract: It is well known that the manufacturing process of many industrial products requires the crane lifting and delivering. The use of crane can not only reduce the cost of manual handling, but also increase the production's capacity. Thus, how to design an accurate, efficient and optimal crane scheduling becomes a very important issue in the industrial manufacturing process, especially to the electronic industry. This paper presents an optimal crane scheduling and control for the multiple manufacturing processes of electronic surface treatment based on the entire plant design. The expert system with “time-axis” method is used to find the minimum number of cranes needed for the entire plant design. The surface treatment of electronic industry

is used as the example for the whole design process. The result shows that the optimal crane scheduling developed can not only have the optimal cranes' control, but also fit the requirement of minimum cycling time of each manufacturing process. (28 refs.)

Inspec controlled terms: chemical mechanical polishing - cranes - design engineering - electronic products - expert systems - industrial plants - scheduling

Uncontrolled terms: electronic surface treatment - industrial manufacturing process - chemical polishing process - optimal crane scheduling - electronic industry - entire plant design - expert system

Classification Code: C1290F Systems theory applications in industry - E1010 Production management - E1540 Systems theory applications - E1400 Design - E1520N Surface treatment and coating techniques - E1530 Manufacturing facilities - E1850 Materials handling equipment - E3644 Electronics industry

IPC Code: B66C

Treatment: Practical (PRA); Theoretical or Mathematical (THR)

Database: Inspec