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**Union of Electronics, Electrical Engineering and Telecommunications (CEEC)**  
**Ministry of Transport, Information Technology and Communications**  
**The Communications Regulation Commission**  
**Technical University of Sofia**  
**Union of Scientists in Bulgaria**  
**Telecommunications Association (ASTEL)**  
**26-th NATIONAL CONFERENCE**  
**WITH INTERNATIONAL PARTICIPATION**

# **TELECOM 2018**

**TELECOMMUNICATIONS – THE BASIS OF THE  
DIGITAL ECONOMY AND THE DIGITAL SOCIETY**



## **A B S T R A C T S**

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Kiril Konov – CEEC**

7.

## **ALGORITHM FOR FINDING A MINIMAL MAKESPAN IN FJSSP BY MEANS OF PARTICLE SWARM OPTIMIZATION**

**Asen Toshev\*, Vassil Guliashki\***

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This article offers algorithm for solving the flexible job shop scheduling problem. It uses a particle swarm optimization. A new problem formulation, including binary variables for operations performance notation, is proposed. The discrete space is presented in a way, allowing it to be used as a continuous space. Some results are presented.

8.

## **VIRTUAL 3D MODELS OF RADIO SIGNALS IN REAL CONDITIONS**

**Tsoni Tsonev, Anushka Stancheva, Boncho Balabanov**

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The radio waves fade away as they propagate through the space, depending on the distance. Terrain, buildings, plants and other irregularities limit the radio waves level by adding further attenuation. We have terrain data with different formats, and the radio signals are displayed on the map with different colors at 5 dB after calculations according to the selected model. Drawing terrain along with radio signals such as 3D images, using the capabilities of the OPEN-GL-4 system, allows to monitor the levels of radio signals in all directions. As virtual images, they can move and rotate in all directions and the radio signals are monitored in front of and behind the closures. This report provides appropriate examples and shows complex 3D images of the terrain and the electromagnetic environment with selected radio networks.

9.

## **PLATFORMS AND MODELS FOR MOBILE SECURITY**

**Rosen Pasarelski, Antoni Slavinski**

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The purpose of this article is to present the major mobile platforms of leading IT companies such as Apple, Microsoft, Google and review and analyze the level of mobile security. The main focus is placed on the most popular and popular operating system for mobile smart devices - Android. The report presents and analyzes vulnerabilities in the platform, proposing and investigating techniques and techniques for testing and preventing possible breakthroughs and the ultimate end-users.

## 10.

### **COLLECTIVE MANAGEMENT OF RIGHTS IN THE LIGHT OF THE TRANSPPOSITION OF THE DIRECTIVE 2014/26/EU AND THE TELECOMMUNICATIONS OPERATORS**

**Boyko Harlov - „Club 2000”, Darina Stoyanova – „Virginia R N“**

The rapid development of content-related technologies such as television, music, films has long gone beyond the legal framework of copyright, creating a vacuum in the relationship between authors and producers of products, telecom operators and end-users.

The article examines the transposition into national law of Directive 2014/26/EU of the European Parliament and of the Council, implemented by the adoption of the Law for Copyright and Related Rights the Protection of Competition in the sphere of telecommunication enterprises, which provide the service "Broadcasting of radio and television programs".

There are fears of adverse consequences for Bulgaria, which may result from the incorrect transposition of the directive into our national legislation. Problems and irregularities in the area of copyright and related rights management are extremely sensitive not only to content users but also to authors and end-users. Poorly regulated legal relationships will confuse the business, and end users who will be forced to pay higher monthly fees or authors who will not receive the paid wages will be paid.

## 11.

### **PHYSICAL INFRASTRUCTURE AND THEIR USE BY THE OPERATORS OF ELECTRONIC COMMUNICATIONS NETWORKS**

**Kamena Tsaneva\*, Darina Stoyanova\*\***

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This article considers the problems arise afore the business when do transposition of Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks in our legislation, namely the Act of Electronic Communications Networks and Physical Infrastructure.

The article concerns the increase in the administrative burden and the cost of building electronic communications networks, which are in conflict to the objectives of the Directive and its overarching purpose of building high-speed electronic communications networks cheap to the end user, and therefore developing the digital society as a whole.

## 12.

### **MARKET POSITIONS OF THE POSTAL OPERATORS IN THE DOMESTIC MARKET**

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The Law on Postal Services divides the market of the postal services in the country in three segments: (1) „services from the package of the universal postal service“; (2) „services within the scope of the universal postal service“; (3) „non-universal postal service“. Subject of this report are the first two market segments, which may be considered as individual product markets. There are significant differences in the conditions and methods of provisioning of the services as well as in their price characteristics. The services from the first segment – package of the universal postal service are provided under imposed obligation only by the public postal operator „Bulgarian posts“, which is not entitled to provide the services from the second market segment. The services from the segment – within the scope of the universal postal service are provided by licensed private postal operators, which are not entitled to provide services from the first market segment. These particularities provide the opportunity for different measurement and interpretation of the trends of the market shares of the players in the postal sector.

Key words: services from the package of the universal postal service; services within the scope of the universal postal service; product markets; market positions of the postal operators.

### 13.

#### **SPECTRA OF MULTILAYER NETWORKS - MATHEMATICAL FOUNDATIONS, METRICS, SPECTRAL PROPERTIES**

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This paper reviews a generalize approach of network models of complex systems and networks by introducing layers, thus defining multilayer networks. Having the multilayer property on the network model, it can better describe the complex system and give better results in the analysis of network science. In this paper are given the mathematical foundations and definitions of generalized multilayer networks, as well as typical classes of multilayer networks with example references. The approaches of deriving the spectra of such networks are also given. Based on the mathematical foundations and given approaches, it is possible to analyze and compare networks with different layers and from different classes.

### 14.

#### **HIGH EFFICIENCY THREE ELEMENT LINEAR ARRAY ANTENNA**

**Peter Apostolov, Alexey Stefanov**

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This paper discusses a linear array of three elements with the following properties: the elements can be located at any distance without changing the array factor pattern; the array

factor has no azimuthal side lobes; the array factor mainlobe may be arbitrarily narrow. Analytical expressions for array factor and its parameters are proposed. Matlab® simulations have been demonstrated.

## 15.

### **EVALUATION OF EFFECTIVENESS OF METHOD FOR OPTIMUM LINEAR SIGNAL PRE-EQUALIZATION**

**Peter Ivanov, Hristina Spiridonova, Galina Cherneva**

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The modern radio communication systems with safety responsibility are required to guarantee determinately level of noise-resistance stability independently of the variability activity of the channel. The paper presents a method for signal pre-equalization at the transmission side of communication channel, which allows to implement distortion compensation on a predetermined frequency interval. The problem of evaluation a method effectiveness is considered.

## 16.

### **INTERNET PACKET GENERATOR FOR TESTING OF NETWORK DEVICES**

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The paper presents the implementation of software – an internet packet generator that can be used for testing of network devices. For the generator's implementation is used the programming language C, as well as the technology Raw Socket in Linux environment. The network protocols that can be generated by the developed software are IGMP, UDP and ICMP. The working capacity of the generator is tested by the specialized programs Wireshark and tcpdump. The internet protocol generator is designed to be used by system/network administrators (rather than by regular users) that is why it is not having a GUI, but a command line interface only.

## 17.

### COMPARISON OF FOUR CONCEPTUAL MODELS OF A QUEUING SYSTEM IN SERVICE NETWORKS

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Queuing systems are important type of components of almost all service networks. Despite this, in the scientific literature, the graphical representation of their conceptual models is too simplified and one-sided. On the other hand, models of queues using Generalized nets are not studied enough. In the present paper, four different conceptual models of a queuing system, containing buffer and server, are described and compared. Three of the models are independent of the used analytical models while one of them is oriented towards the Generalized nets. Five problems connected to the graphical representation of queuing systems are formulated. The results can be used for illustration for the purpose of teaching, for the selection of analytical approach to the modeling of specific queuing systems and for the development of systems for graphical representation.

## 18.

### ANALYSIS OF NON-PREEMPTIVE PRIORITY SINGLE-SERVER QUEUEING SYSTEMS WITH PEAKED TRAFFIC FLOWS

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In this paper, a single-server priority queueing system with a peaked arrival process, generally distributed service time and infinite waiting position is analysed by using the Polya distribution to describe the peaked traffic flow. The model of this queueing system is obtained using a generalized Pollaczek-Khinchin formula. In the paper, the dependence of the mean waiting time in the system with four priority classes with non-preemptive priority from the offered traffic with different values of the peakedness coefficient of the arrival process and different values of the coefficient of variation of service process is presented. It is shown that the performance of this single-server priority queueing system varies vastly depending on the peakedness of the arrival and service processes.

## 19.

### **COMPARATIVE ANALYSIS OF THE POSSIBILITIES OF BUILDING A DECENTRALIZED CONTROL PLANE OF A SOFTWARE DEFINED NETWORKS**

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The objective of the current paper is to be conducted a comparative analysis of the possibilities of building a decentralized controller plane of a Software Defined Network (SDN). The SDN network are an emerging paradigm, which aims to change telecommunications networks as we known them today. The constantly growing social media, mobile communications and technologies like server virtualization are pushing the limits of traditional computer networks. That led to a lot of researching in the field of network virtualization and more specifically the field of software defined networking. Unfortunately, as every new technology and this one has its flaws. One of the biggest research field is investigating the possibilities of building a decentralized control plane to avoid issues related to the single point of failure, scalability, high availability and security.

## 20.

### **FUNCTIONAL OPPORTUNITIES OF THE VIRTUAL EHEALTH CENTER**

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In the Bulgarian web environment in the sphere of healthcare and medicine there are still some lacks or hardly to find reliable and verifiable sources of information. On the other hand, online research and testing of people with disabilities is an innovative self-help method and an easily accessible way of getting information on available resources in helping people with disabilities. The combination of those two needs has led to the gathering of an international team of scientists united by the goal of creating a concept and developing a web platform where:

- to set and test educational resources, techniques and online practices of trainees
- to implement resources for collecting, storing and processing medical and health information on profiles that can be used by learners - students, specialists, representatives of people with disabilities and their relatives,
- to conduct TelePresence seminars, workshops and tele-education through specialized software platforms,
- to develop a Moodle training environment for patients, video tutorials and presentations devoted to various health and medical themes.

In the form of feedback and information gathering from the public, simulations of patient teleconsultations will be carried out through a platform for webinar meetings, demonstration training workshops to present the use of active elearning methods, demo version of medical

software solutions, whose basic direct result will be the immediate expansion of the range of practical training.

## 21.

### **DISTANCE EDUCATIONAL PROGRAM “EHEALTH - WORK WITH PEOPLE WITH DISABILITIES”**

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The educational distance program on "eHealth - working with people with disabilities" aims to complete a full cycle of created educational resources to train students and professionals in methods of supporting people with disabilities and training of the people with disorders and their families the overall program or its individual components / according to the possibilities and needs of people with disabilities/. Individual program courses and individual learning tools can also be used for targeted learning in specific knowledge and / or skills for different groups of professionals, people with disabilities and their families. Through the development of this unique targeted program, who was created by an international team of Norway, Romania, Germany and Russia is increased the quality of Bulgarian education for specialists helping professions / as target group / / form of continuing education / through the development of interactive forms of theoretical and practical activities, the use of distance learning resources and practice, opportunities for working in an online platform and the use of online resources for self-study and application in practice.

The program on "eHealth - working with people with disabilities" as a training program has four main user groups: patients, medical and health professionals, healthcare management system experts and the civil society.

## 22.

### **ANALYSIS OF LEGISLATION AND GUIDELINES FOR THE DEVELOPMENT OF THE TECHNICAL PROVISION OF UNMANNED AERIAL SYSTEMS**

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Trends and current developments lead to an increase use of unmanned aircraft systems (UAS). UAS operations and their use significantly increase each day. In order for this development to be fully applied, it needs an appropriate regulatory framework to encompass the development and implementation of unmanned aerial systems. This publication analyzes the current state of legislation covering the safety operation of small unmanned aerial systems in the United States of America (USA), the European Union (EU), the Balkan countries and Bulgaria and its potential development in the future. Discusses any future

problems with the legislation and proposes solutions for control of UAS, affecting the security of their use.

### 23.

#### **BLOCKCHAIN IN THE TELECOM INDUSTRY**

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This article looks at the introduction of Blockchain technology in the telecoms industry. Blockchain is one of the disruptive technologies that is rapidly entering all sectors of the industry, economy and life. This article examines some scenarios in the telecommunication sector and the first case of application. The topic is too new and hot and will soon begin to explore the positive and negative trends of Blockchain effects.

### 24.

#### **ACCELERATING DIGITAL TRANSFORMATION AND PRESERVING THE PURITY OF THE BULGARIAN LANGUAGE - A GREAT COVENANT OF OUR ANCESTORS**

**Prof. Boris Yovchev**

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This article aims to present the author's views on some aspects of the introduction of new English-language terms into Bulgarian, as a consequence of the development of Industry 4.0 in Bulgaria. The type of measures the government and different NGOs should undertake in this area are prescribed. For more information, please e-mail: prof.jovchev@mail.bg

### 25.

#### **ONE POSSIBILITY APPROACH OF THE CYBER OMBUDSMAN**

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The article presents the idea for one possibility of the approach for the cyber-ombudsman for the legal aid for the citizen.

# Information

## for the participants and guests of Telecom 2018

Until 26 October 2018 detailed information on issues of the Conference can be obtained at the National House of Science and Technology in Sofia, 108 Rakovski St., V Floor, Room 506 or by phone: 02 987-97-67 and 0887508262.

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Website of the conference: <http://ceec.fnts.bg/telecom>

Registration fee: Participants with/without a paper - Euro 50, Students - Euro 25. The fee should be preferably paid before October 14, 2013 through a bank transfer on the account of:

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By way of exception the Registration Fee may be paid upon arrival at the Conference site in cash (Euro 55).

The Registration Fee includes admission to all Conference events, a set of Conference materials (program, abstracts, CD with papers etc.) and cocktail.

The Organizing Committee will award a young author (up to 35 years old) for the best individually presented paper with substantial scientific research contribution.

