



# 2020 IEEE 2nd International Conference on Advanced Trends in Information Theory (IEEE ATIT 2020)



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## CONFERENCE PROGRAM



25.11.20 - 27.11.20

Kyiv  
Ukraine

## **ORGANIZERS**

- **IEEE Ukraine Section.**
- **IEEE Ukraine Section Information Theory Society Chapter.**
- National Academy of the Security Service of Ukraine.
- The National Defence University of Ukraine named after Ivan Cherniakhovskiy, Ukraine.
- National Aviation University of Kyiv, Ukraine.
- Kharkiv National University of Radio Electronics, Ukraine.
- National Aerospace University «Kharkiv Aviation Institute», Kharkiv, Ukraine.

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- **Prof. Oleksandr Yudin**, National Academy of the Security Service of Ukraine.

CHAIR \ IEEE Ukraine Section Information Theory Society Chapter.

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- Associate Prof. Elena Chebanyuk, National Aviation University of Kyiv, Ukraine.
- Prof. Svetlana Loboda, National Aviation University of Kyiv, Ukraine.
- Prof. Hennadii Khalimov, Kharkiv National University of Radio Electronics, Ukraine.
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- Prof. Valeriy Lakhno, National University of Life and Environmental Sciences of Ukraine, Ukraine.
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- Valeriy Lakhno, National University of Life and Environmental Sciences of Ukraine.
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- Associate Prof. Albert Lekakh Kharkov National University of Radio Electronics, Ukraine.
- Roman Puhachov, National Technical University "Kharkiv Politechnic Institute".
- Associate Prof. Andrii Krasnorutsky, Kharkov National University of Radio Electronics, Ukraine.

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- Oleh Suprun, Technical secretary, Taras Shevchenko National University of Kyiv, Ukraine.
- Associate Prof. Vitaliy Tverdokhlib, Technical secretary Track 1, Kharkov National University of Radio Electronics, Ukraine.
- Artem Kramov, Technical secretary Track 2, Taras Shevchenko National University of Kyiv, Ukraine.

# CONFERENCE SECTIONS

**25<sup>th</sup> November 2020**

**9.45 - 10.00 – Registration** (*On-line session in Zoom*).

**10.00-11.30 – Opening of conference. Plenary reports / Part 1** (*On-line session in Zoom*).

**Moderators:**

*Prof. Oleksandr Yudin, IEEE Ukraine Section Information Theory Society Chapter , Ukraine.  
Associate Prof. Viktoriia Ivannikova, National Aviation University of Kyiv, Ukraine.*

**Technical secretary**

*Oleh Suprun, Taras Shevchenko National University of Kyiv, Ukraine.*

10:00 - 10:15	<b><i>The role of IEEE in Ukraine. IEEE Ukraine Section.</i></b>	<i>Prof. Felix Yanovsky, IEEE Life Fellow, IEEE Ukraine Section Chairperson, National Aviation University, Kyiv, Ukraine.</i>
10:15 - 10:30	<b><i>Research focus of the IEEE Ukraine Section of Information Theory Society Chapter.</i></b>	<i>Prof. Oleksandr Yudin, CHAIR \ IEEE Ukraine Section Information Theory Society Chapter. National Academy of the Security Service of Ukraine.</i>
10:30 - 10:45	<b><i>Analysis of methods for creating media for long-term data storage</i></b>	<i>Prof. Vyacheslav Petrov Academician of NAS of Ukraine, Institute for Information Recording of the National Academy of Sciences of Ukraine</i>

10:45 - 11:00	<b><i>Synthesis of the Structure of Multilevel Hierarchical Systems of Increased Survivability Based on a Subjective Probability Model</i></b>	<i>Prof. Yurii Kravchenko, Taras Shevchenko National University of Kyiv, Ukraine</i>
11:00 - 11:15	<b><i>Methodological fundamentals of deciphering coding of aerophotography segments on special equipment of unmanned complex.</i></b>	<i>Prof. Vladimir Barannik, Kharkov National University of Radio Electronics.</i>  <i>Associate Prof. Sergii Shulgin, Kharkov National University of Radio Electronics.</i>
11:15 - 11:30	<b><i>Marginal Utility Approach for Quality of Service evaluation in IT infrastructure</i></b>	<i>Prof. Oleksandr Rolik. Igor Sikorsky Kyiv Polytechnic Institute, Ukraine.</i>
11:30 - 11:45	<b><i>An approach to better portable graphics (bpg) compression with providing a desired quality</i></b>	<i>Fangfang Li National Aerospace University – KhAI Kharkiv, Ukraine.</i>  <i>Prof. Vladimir Lukin National Aerospace University – KhAI. Sergey Krivenko National Aerospace University – KhAI Kharkiv, Ukraine. Kharkiv, Ukraine</i>

11:45 - 12:00	<b><i>Three-pass cryptographic protocol based on permutations</i></b>	<p><i>Prof. Emil Faure, Cherkasy State Technological University, Cherkasy, Ukraine.</i></p> <p><i>Associate Prof. Shcherba Anatoly, Cherkasy State Technological University, Cherkasy, Ukraine.</i></p>
12:00 - 12:15	<b><i>Determination of signs of information and psychological influence in the tone of sound sequences</i></b>	<p><i>Prof. Oleksandr Korchenko, National Aviation University, Kyiv, Ukraine.</i></p> <p><i>Prof. Ihor Tereikovskiy, National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine</i></p>

**12.15-13.00 –Technical break.**

**13.00-17.30 – Parallel working Tracks groups.**

## Track 1

**13.00 -17.30 – Track 1** (*On-line session in Zoom*).

**Moderators:**

*Prof. Volodymyr Barannik, Kharkov National University of Radio Electronics, Ukraine.*

**Technical secretary:**

*Associate Prof., Vitaliy Tverdokhlib, Kharkov National University of Radio Electronics, Ukraine.*

Track ID - 1	Track 1 Title <b>Information and Encoding Theory</b>	Author	Number of accepted papers
<b>Tr.1.1</b>	An approach to better portable graphics (bpg) compression with providing a desired quality	Fangfang Li, Sergey Krivenko, Vladimir Lukin	<b>23</b>
<b>Tr.1.2</b>	The Model of Production Complex Elements States Discrete Encoding	Iana Savitskaya Victor Smolii Vitalii Shelestovskii	<b>48</b>
<b>Tr.1.3</b>	Comparison of Floating-Point Numbers Absolute Values when Representation of the Exponents with Sign-Inverse Two's Complementary Code	Oleksandr Samoshchenko Heorhii Marhiiev Oleksandr Miroshkin	<b>11</b>
<b>Tr.1.4</b>	Technology for protecting video information resources in the info-communication space	Vladimir Barannik, Sergy Sidchenko, Dmitry Barannik	<b>61</b>
<b>Tr.1.5</b>	Constructing the code description of the transformant dct taking into account their structural features	Natalia Barannik, Kateryna Zakomorna, Vitaliy Tverdokhlib, Nataliya Vorontsova, Eliseev Evgeniy, Vitalii Shmakov	<b>65</b>



<b>Tr.1.6</b>	Methodological fundamentals of deciphering coding of aerophotography segments on special equipment of unmanned complex	Vladimir Barannik, Sergii Shulgin, Andrii Krasnorutsky, Oleksandr Slobodyanyuk, Pavlo Gurzhii, Natalia Korolyova	<b>66</b>
<b>Tr.1.7</b>	Advanced method of movement compensation in video coding technologies	Victoriya Himenko Olexandr Shaigas, Oleksii Kolomiitsev, Oksana Stetsenko, Evgeniy Eliseev	<b>67</b>
<b>Tr.1.8</b>	The analysis of the internal restructuring method efficiency used for a more compact representation of the encoded data	Valeriy Barannik, Ivan Tupitsya, Olexandr Kovalenko, Yevhenii Sidchenko, Valerii Yroshenko, Oleg Stepanko	<b>69</b>
<b>Tr.1.9</b>	Significant microsegment transformants encoding method to increase the availability of video information resource	Volodymyr Barannik, Valeriy Barannik, Olena Matviichuk-Yudina, Yurii Babenko, Andriy Khimenko, Oleg Kulitsa	<b>70</b>
<b>Tr.1.10</b>	Method of indirect steganographic coding of information without visual distortion of the video container series	Yuriy Ryabukha, Natalia Barannik	<b>72</b>
<b>Tr.1.11</b>	Intelligent multi-service platform for building management	Oleksandr Prokhorov Yurii Pronchakov Oleg Fedorovich	<b>16</b> <i>poster</i>
<b>Tr.1.12</b>	Method of encoding binary structures of stationary component of video stream	Oleksandr Yudin, Anna Hahanova, Olexandr Shaigas Serhii Pchelnykov, Vitalii Shmakov, Maksym Parkhomenko	<b>62</b> <i>poster</i>
<b>Tr.1.13</b>	Fast coding of irregular binary binomial numbers with a set number of units series	Valeriy Barannik	<b>71</b> <i>poster</i>

<b>Tr.1.14</b>	The method of embedding information in the noise domain based on the modification of elements in the pseudo-spatial domain	Natalia Barannik, Oleksandr Yudin, Ali Bekirov, Volodymyr Manakov, Mykhailo Babenko, Valerii Yroshenko	<b>73</b> <i>poster</i>
<b>Tr.1.15</b>	Stegano-compression coding in a non-equalible positional base	Dmitry Barannik	<b>74</b> <i>poster</i>
<b>Tr.1.16</b>	Decoding method of information-psychological destructions in the phonetic space of information resources	Tatyana Belikova	<b>80</b> <i>poster</i>
<b>Tr.1.17</b>	Research of Features and Possibilities of Modern Real Time Video Services	Olha Suprun, Viktor Matviichuk, Yurii Babenko, Anton Sorokun, Serhii Voskoboinikov, Oleh Suprun	<b>102</b> <i>poster</i>
ACCEPTED PAPERS, TOTAL		<i>17</i>	
SUBMITTED PAPERS, TOTAL		<i>18</i>	
ACCEPTANCE RATE		<i>0.94</i>	

## 26<sup>th</sup> November 2020

**10.00-16.00 – Parallel working Tracks groups.**

### Track 2

**10.00 - 16.00 – Track 2** (*On-line session in Zoom*).

**Moderators:**

*Prof. Yurii V. Kravchenko, Taras Shevchenko National University of Kyiv, Ukraine.*

*Prof. Sergiy D. Pogorilyy, Taras Shevchenko National University of Kyiv, Ukraine.*

**Secretary:**

*Artem Kramov, Taras Shevchenko National University of Kyiv, Ukraine.*

<b>Track ID - 2</b>	<b>Track Title</b> <b>Communication Theory</b>	<b>Author</b>	<b>Number of accepted papers</b>
<b>Tr.2.1</b>	Design and Simulation of Synchronization Systems in Telecommunications with QPSK	Ilya Pyatin Juliy Boiko Oleksander Eromenko	<b>13</b>
<b>Tr.2.2</b>	Face recognition systems based on Neural Compute Stick 2, CPU, GPU comparison	Oleksandra Aleksandrova Yevgen Bashkov	<b>14</b>
<b>Tr.2.3</b>	Factors affecting synchronization time of tree parity machines in cryptography	Mykyta Aleksandrov Yevgen Bashkov	<b>15</b>
<b>Tr.2.4</b>	Method of trajectory control uav in autonomous flight mode using neural network melm algorithm	Oleksii Fesenko Robert Bieliakov Hrygorii Radzivilov Volodymyr Hulii Oleh Kovalchuk Liudmyla Korotchenko	<b>27</b>
<b>Tr.2.5</b>	Correlation network of concepts determined by the dynamics of publications	Dmytro Lande Leonard Strashnoy Iryna Balagura	<b>49</b>
<b>Tr.2.6</b>	New Traffic Model of M2M Technology in 5G Wireless Sensor Networks	Andrew Bulashenko Stepan Piltyay Alina Polishchuk Oleksandr Bulashenko	<b>52</b>
<b>Tr.2.7</b>	Flight safety fuzzy risk assessment for combat aviation system	Yevhen Honcharenko Oleksii Martyniuk Oleh Radko Oleksandr Blyskun Yurii Kolomiets Mykola Bilokur	<b>60</b>

<b>Tr.2.8</b>	Synthesis of the Structure of Multilevel Hierarchical Systems of Increased Survivability Based on a Subjective Probability Model	Viktor Bondarenko Yurii Kravchenko Serhii Salkutsan Maksym Tyshchenko	<b>82</b>
<b>Tr.2.9</b>	Secure Based Traffic Engineering Model in Softwarized Networks	Oleksandr Lemeshko Oleksandra Yeremenko Maryna Yevdokymenko Anastasiia Shapovalova Tamara Radivilova Dmytro Ageyev	<b>87</b>
<b>Tr.2.10</b>	Determining the effectiveness of signals detection during search	Erokhin V. F Romanov O. M. Nikolaev S. N.	<b>98</b>
<b>Tr.2.11</b>	The Network Reliability Assessment and Risk Prevention Measures for the Power System of Kazakhstan Due to High Renewables	Svetlana Zhakiyeva Bekzhan Mukatov Rustam Nassirkhan Nurkhat Zhakiyev	<b>105</b>
<b>Tr.2.12</b>	Mathematical Model for Heterogeneous Databases Parameters Estimation in Distributed Systems with Dynamic Structure	Vadym Mukhin Yaroslav Kornaga Viktor Bondarenko Valerii Zavgorodnii Oksana Herasymenko Oleksii Sholokhov	<b>106</b>
<b>Tr.2.13</b>	Methods of Assessing the Scientific Activity of Scientists and Higher Education Institutions	Andrii Biloshchytskyi Alexander Kuchansky Yurii Andrashko Aidos Mukhatayev Sapar Toxanov Adil Faizullin	<b>111</b>
<b>Tr.2.14</b>	Hierarchical model of a complex of IoT devices based on the use of a wireless sensor network	Yrii Afanasiev Volodymyr Afanasiev Oleksii Sitkov Valerii Chystov Vitalii Surhai Serhii Fediuk	<b>114</b>

<b>Tr.2.15</b>	The method of improving the quality of signal detection by accounting for interference	Oleksandr Laptiev Igor Polovinkin Savchenko Vitalii Oleh Stefurak Oleg Barabash Olena Zelikovska	<b>10</b> <i>poster</i>
<b>Tr.2.16</b>	The new method for detecting signals of means of covert obtaining information	Oleksandr Laptiev Savchenko Vitalii Serhii Yevseiev Halyna Haidur Sergii Gakhov Spartak Hohoniants	<b>17</b> <i>poster</i>
<b>Tr.2.17</b>	The Results of System Analysis of Functional Diagrams and Operation Algorithms of Tracking Systems of Tracking Radar of Antiaircraft Missile Armament With Digital Processing of Error Signal	I. Sachuk P. Kushch A. Kalyta P. Open'ko V.Orlenko S. Bondarenko	<b>19</b> <i>poster</i>
<b>Tr.2.18</b>	Intellectual fuzzy system air pollution control	Yuri Kravchenko Olga Leshchenko Nataliia Dakhno Vladyslav Deinega Halyna Shevchenko Oleksandr Trush	<b>24</b> <i>poster</i>
<b>Tr.2.19</b>	Usage of Fourier transformation in theoretical studying of signals in data transmission	Andriy Makarchuk Inna Kal'chuk Yurii Kharkevych Tetiana Voloshyna	<b>38</b> <i>poster</i>
<b>Tr.2.20</b>	Usage of Fourier transformation theory in machine translation	Galyna Kharkevych Yurii Kharkevych Inna Kal'chuk Valentyn Sobchuk	<b>44</b> <i>poster</i>
<b>Tr.2.21</b>	Development of an all-based method using blockchain technologies and cuda technologies	Tetiana Domkiv Andriy Dudnik Nataliia Dakhno Volodymyr Kvasnikov Olexander Trush Serhii Dorozhynskyi	<b>63</b> <i>poster</i>

<b>Tr.2.22</b>	Algorithm of control of functionally stable manufacturing processes of enterprises	Valentyn Sobchuk Volodymyr Pichkur Oleg Barabash Oleksandr Laptiev Kovalchuk Igor Amina Zidan	<b>75</b> <i>poster</i>
<b>Tr.2.23</b>	Intrusion and fire detection method by wireless sensor network	Andriy Dudnik Pokutnia Daria Mykyta Kobylchuk Tetyana Domkiv Natalia Dahno Olga Leshchenko	<b>76</b> <i>poster</i>
<b>Tr.2.24</b>	Modeling of solving stabilized differential equations by differential-Taylor transformations	Mykhailo Rakushev Yurii Kravchenko Oleksandr Permiakov Oleksandr Lavrinchuk Vasyl Bychenkov Valerii Krainov	<b>86</b> <i>poster</i>
<b>Tr.2.25</b>	Methods for predicting adjustments to the rates of modern “digital money”	Olga Leshchenko Olexander Trush Natalia Dahno Andriy Dudnik Karina Kazintseva Olexander Kovalenko	<b>92</b> <i>poster</i>
<b>Tr.2.26</b>	Modeling the characteristics of the stabilization circuit of a hypothetical dynamic system	Sergii M. Korotin Anatolii G. Salii Yurii P. Tselishev Ivan P. Korovin Andrii V. Kotsiuruba Yurii M. Kolomiets	<b>101</b> <i>poster</i>
<b>Tr.2.27</b>	Information model of decision support in the design of information and communication systems based on the customer's profile	Viacheslav Riabtsev Yurii Kravchenko Serhii Salkutsan Maksym Tyshchenko Dmytro Sharadkin Viktor Bondarenko	<b>103</b> <i>poster</i>

<b>Tr.2.28</b>	Analysis of methods for creating media for long-term data storage	Vyacheslav Petrov Ievgen Beliak Andriy Kryuchyn Alexey Shikhovets	<b>115</b> <i>poster</i>
<b>Tr.2.29</b>	Research on the formation level of methodological competence of IT disciplines teachers	Andrii Biloshchytskyi Serik Omirbayev Aidos Mukhatayev Adil Faizullin Sapar Toxanov Khanat Kassenov	<b>116</b> <i>poster</i>
<b>Tr.2.30</b>	Hidden Transmitter Localization Accuracy Model Based on Multi-Position Range Measurement	Vitalii Savchenko Oleksandr Laptiev Oleksandr Kolos Rostyslav Lisnevskyi Viktoriiia Ivannikova Ivan Ablazov	<b>118</b> <i>poster</i>
ACCEPTED PAPERS, TOTAL		30	
SUBMITTED PAPERS, TOTAL		38	
ACCEPTANCE RATE		0.78	

## 26<sup>th</sup> November 2020

**10.00-16.00 – Parallel working Tracks groups.**

### Track 3

**10.00 - 14.00 – Track 3 (On-line session in Zoom).**

**Moderators:**

*Prof. Oleksandr Korchenko, National Aviation University of Kyiv, Ukraine.*

*Prof. Ihor Tereikovskiy, Igor Sikorsky Kyiv Polytechnic Institute, Ukraine.*

*Prof. Emil Faure, Cherkasy State Technological University, Cherkasy, Ukraine.*

**Secretary:**

*Yurii Dreis, Technical secretary, National Aviation University, Kyiv, Ukraine*

Track ID - 3	Track Title	Author	Number of accepted papers
	<b>Technologies of Informative Security</b>		

<b>Tr.3.1</b>	The use of a genetic algorithm in the problem of distribution of information security organizational and financial resources	Valeriy Lakhno Andrii Blozva Bakhytzhan Akhmetov Rzaieva Svitlana Saltanat Adilzhanova Rzaiev Dmytro	<b>32</b>
<b>Tr.3.2</b>	Method of fuzzy classification of information with limited access	Serhii Falchenko Aleksandr Korchenko Vitalii Hrebenuik Iryna Manzhul Alla Hrebenuik Yurii Dreis	<b>34</b>
<b>Tr.3.3</b>	Detection and testing of dependencies between input and output data in the implementation of multi-digit algorithms in a parallel computational model	Andrii Tereshchenko Valeriy Zadiraka	<b>58</b>
<b>Tr.3.4</b>	Counteraction to strategic manipulations on actors' decision making in social networking services	Kateryna Molodetska	<b>81</b>
<b>Tr.3.5</b>	Methods of security authentication and authorization into informational systems	Korchenko Anna Kazmirchuk Svitlana Kryvoruchko Olena Synichuk Olena Kostiuk Mykhailo Zakharov Rostyslav	<b>89</b>
<b>Tr.3.6</b>	Determination of signs of information and psychological influence in the tone of sound sequences	Oleksandr Yudin Oleksandr Korchenko Ihor Tereikovskyyi Serhii Toliupa Liudmyla Tereikovska Oleh Tereikovskyyi	<b>91</b>
<b>Tr.3.7</b>	Three-pass cryptographic protocol based on permutations	Emil Faure Shcherba Anatoly Lavdanska Olha	<b>97</b>
<b>Tr.3.8</b>	Protection of information in assessing the factors of influence	Tsiutsiura Mykola Terentiev Oleksandr Tsiutsiura Svitlana Kyivska Kateryna Yerukaiev Andrii Kuleba Mykola	<b>104</b>
<b>ACCEPTED PAPERS, TOTAL</b>			<b>12</b>



SUBMITTED PAPERS, TOTAL	8	
ACCEPTANCE RATE	0.67	

# 27<sup>th</sup> November 2020

10.00-18.00 – Parallel working Tracks groups.

12.30-13.00 – Technical break.

## Track 4

10.00 - 18.00 – Track 4 (*On-line session in Zoom*).

### Moderators:

*Prof. Oleksandr Rolik, Igor Sikorsky Kyiv Polytechnic Institute, Ukraine.*

*Prof. Bogdan Korniyenko, Igor Sikorsky Kyiv Polytechnic Institute, Ukraine.*

### Secretary:

*Oleg Suprun, Technical secretary, Taras Shevchenko National University of Kyiv, Ukraine.*

*Artem Kramov, Technical secretary, Taras Shevchenko National University of Kyiv, Ukraine.*

Track ID – 4	Track Title	Author	Number of accepted papers
Tr. 4.1	Synthesis of high-speed Neuro-Fuzzy controllers based on FPGA	Petro Kravets, Viacheslav Nevolko, Volodymyr Shymkovich, Lyubov Shymkovich	6 <i>poster</i>
Tr. 4.2	Evaluation of the Coherence of Ukrainian Texts Using a Transformer Architecture	Artem Kramov, Sergiy Pogorilyy	7
Tr.4.3	Nonparametric Multiple Comparison Test for Change-Point Detection in Big Data	Dmitriy Klyushin, Kateryna Golubeva	18
Tr.4.4	Control System for the Production of Mineral Fertilizers in a Granulator with a Fluidized Bed	Bogdan Korniyenko, Lesya Ladieva, Liliya Galata	21 <i>poster</i>
Tr.4.5	System of Control of the Process of Alkylation of Benzene with Peripene in the Liquid Phase	Lesya Ladieva, Tetiana Klusta, Zvenyslava Kozanevych Bogdan Korniyenko	22 <i>poster</i>

<b>Tr.4.6</b>	Information Technology for the Recognition of Semi-Precious Minerals	Mikhail Polishchuk, Mikhail Tkach	<b>25</b>
<b>Tr.4.7</b>	Cyber-physical-logistical systems: state-of-the-art	Illia Holovatenko, Andrii Pysarenko	<b>26</b> <i>poster</i>
<b>Tr.4.8</b>	Adaptive algorithm for variational inequality problem over the set of solutions the equilibrium problems	Sergey Denisov, Vladimir Semenov, Yana Vedel	<b>28</b>
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