

**2022 IEEE Third International Conference  
on System Analysis & Intelligent Computing (SAIC)**

# **CONFERENCE PROGRAM**

**04-07 October, 2022  
Kyiv, Ukraine**

# CONFERENCE SCHEDULE

<b>04.10.2020</b> Academic Building #6, Administrative Council Hall of Igor Sikorsky Kyiv Polytechnic Institute	
<b>10:00 – 10:30</b>	Opening Ceremony
<b>10:30 – 13:30</b>	Plenary Talks
<b>05.10.2020</b> On-line conference	
<b>10:00 – 14:00</b>	Oral Sessions
<b>06.10.2020</b> On-line conference	
<b>10:00 – 14:00</b>	Oral Sessions

The conference on 05.10 and 06.10 will take place on-line using [ZOOM](#) platform. The links for joining will be published on the [SAIC website](#) and sent to participants before the beginning of the conference.

The Plenary Talks will take place offline and on-line using [ZOOM](#) platform. Durations for the Plenary Talks reports are as follows:

- presentation up to 30 minutes;
- discussion up to 10 minutes.

Authors are expected to make oral reports using their presentations. Durations for the reports are as follows:

- presentation up to 20 minutes;
- discussion up to 10 minutes.

The presentations will be recorded.

Papers not presented at the conference will not be submitted for publishing.

**04.10.2020**

**OPENING CEREMONY**

Academic Building #6,  
Administrative Council Hall of Igor Sikorsky Kyiv Polytechnic Institute  
(10:00 – 10:30)

**Welcome speech**

**Mikhailo Zgurovsky**, NASU Academician, Professor, Rector of the National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine

**PLENARY TALKS**

Academic Building #6,  
Administrative Council Hall of Igor Sikorsky Kyiv Polytechnic Institute  
(10:30 – 13:30)

**Moderator** N.D. Pankratova

1	<b>Michael Zgurovsky, Maryna Kravchenko, Ivan Pyshnograiev and Olena Trofymenko</b>	Energy Freedom: Global Analysis
2	<b>Anatolii Petrenko</b>	Tools for Digitalization of Public and Economic Services
3	<b>Oleksandr Trofymchuk, Oksana Timoshchuk, Nataliia Kuznietsova, Vira Huskova, Petro Bidyuk and Sergey Polozhaenko</b>	Intellectual Decision Support System for Modeling and Forecasting Nonlinear Nonstationary Financial Processes and Risks Estimation
4	<b>Peter Kogut, Olga Kuppenko, Rosanna Manzo and Claudia Pipino</b>	On Variational Model in Sobolev-Orlicz Spaces for Spatiotemporal Interpolation of Multi-Spectral Satellite Images
5	<b>Konstantin Atoiev and Pavel Knopov</b>	Modeling of Complex Systems Instability under Risks and Uncertainty

**05.10.2020**

**ORAL SESSIONS**

(10:00 – 14:00)

**TRACK 1: System Analysis of Complex Systems (SACS)**

<b>Moderator</b>		N.D. Pankratova
1	<b>Michael Zgurovsky, Kostiantyn Yefremov, Sergii Gapon and Ivan Pyshnograiev</b>	Modeling of Potential Flooding Zones with Geomatics Tools
2	<b>Oksana Pichugina and Sergiy Yakovlev</b>	New Classes of Unconstrained Permutation-Based Problems and Their Solutions
3	<b>Nataliya Pankratova and Igor Golinko</b>	Digital Twin Simulation for Cyber-Physical Systems on Electric Heater Example
4	<b>Illia Savchenko</b>	Detecting and Handling Flawed Input Data in Modified Morphological Analysis Method
5	<b>Nadezhda Nedashkovskaya</b>	Estimation of the Accuracy of Methods for Calculating Interval Weight Vectors Based on Interval Multiplicative Preference Relations
6	<b>Liudmyla Koliechkina, Oksana Pichugina and Olena Dvirna</b>	Horizontal Method Application to Multiobjective Combinatorial Optimization over Permutations
7	<b>Alexey Malishevsky</b>	Fractal Analysis in Urban Studies: A Case Study on Ukrainian Cities
8	<b>Michael Zgurovsky, Dmitry Lande, Kostiantyn Yefremov, Oleh Dmytrenko, Andrey Boldak and Artem Soboliev</b>	Extracting and Identifying Relationships of Key Phrases in Information Flows
9	<b>Igor Redko, Petro Yahanov and Maksym Zylevich</b>	Intersubjective Paradigm and Oracle Conceptualization as an Open-Closed Platform for Programming Technologicalization
10	<b>Ihor Sosnov, Olena Serhiienko, Yevhen Shapran, Oleksandr Bilotserkivskyi and Inna Ippolitova</b>	Problem-Oriented Model in Technical Specialized Applications of Transport Systems Management

<b>TRACK 2: Methods, Tools, and Applications of Systems Mathematics (MTASM)</b>		
<b>Moderator</b>		P.O. Kasyanov
1	<b>Igor Rystsov</b>	Stochastic Automata and Its Application
2	<b>Andrii Musienko, Andriy Makarchuk, Yuriy Kharkevych, Inna Kal'chuk, Galyna Kharkevych and Maryna Hrysenko</b>	Signals Recovery by Means of Three-Harmonic Equations Solutions
3	<b>Valentyn Sobchuk, Oleksandr Laptiev, Andrii Sobchuk, Volodymyr Nakonechnyi and Iryna Zamrii</b>	Estimates for Harmonic Operators in Modeling Application Processes
4	<b>Roman Tovkach, Andrii Musienko and Valerii Zavgorodnii</b>	Checking the Regularity of the Linear Method of Summation Fourier Series
5	<b>Tetiana Voloshyna, Denys Karakhanov and Mychaylo Voloshyn</b>	On Some Applications of the Orthogonal Systems of Functions
6	<b>Oleg Barabash, Bogdan Borsuk, Andriy Makarchuk, Oleksandr Khanin, Denys Karakhanov and Vasyl Kravets</b>	Some Applied Aspects of Zygmund Function Classes
7	<b>Pavel Knopov and Eugenia Kasitskaya</b>	On Large Deviations for the Solutions of Stochastic Programming Problems with Continuous Parameter
<b>TRACK 3: Computational Intelligence (CI)</b>		
<b>Moderator</b>		Y.P. Zaychenko
1	<b>Yevgeniy Bodyanskiy, Iryna Pliss, Olha Chala and Yuriy Zaychenko</b>	Matrix Neural Network with Kernel Activation Function and Its Online Combined Learning
2	<b>Fedir Geche, Oksana Mulesa, Olexandr Mitsa and Petro Horvat</b>	Synthesis of a Two Cascade Neural Network for Time Series Forecasting
3	<b>Sergii Polozhaenko, Oleksandr Fomin, Andrii Orlov, Valentyn Krykun and Daria Lys</b>	Interpretation Method for Dynamic States Neural Network Models
4	<b>Yuriy Zaychenko, Helen Zaichenko and Galib Hamidov</b>	Investigations of Different Classes Hybrid Deep Learning Networks and Analysis of their Efficiency in Forecasting

5	<b>Serhii Vladov, Yurii Shmelov and Ruslan Yakovliev</b>	Modified Neural Network Method for Diagnostics the Helicopters Turboshift Engines Operational Status at Flight Mode
6	<b>Oleg Soloviov and Yuriy Dyachenko</b>	Biological-Social Expediency, Information Causality and Conceptual Spaces in Neural Networks of the Brain: Approach to Building of Artificial Intelligence Systems
7	<b>Mykola Malyar, Marianna Sharkadi and Nelli Malyar-Gazda</b>	Modeling the Management of Objects with Complex Formalized Information
8	<b>Hanna Yailymova, Polina Mikava, Nataliia Kussul, Tetiana Krasilnikova, Andrii Shelestov, Bohdan Yailymov and Dmytro Titkov</b>	Neural Network Model for Monitoring of Landfills Using Remote Sensing Data
9	<b>Victor Sineglazov, Olexander Klanovets and Kirill Riazanovskiy</b>	Transitive Transfer Learning for Lungs CT Segmentation

**TRACK 5: Data Mining for Complex Socio-Economic Processes and Systems (DMCSEPS)**

<b>Moderator</b>		P.I. Bidyuk
1	<b>Natalia Skorobogatova</b>	Formation of Sustainable Development of Competitive Business in an Unstable Economy
2	<b>Marta Kopytko, Mariya Vinichuk, Olga Guk, Lina Shenderivska and Hanna Mokhonko</b>	Financial Stability as a Factor of Ensuring Sustainable Development of Ukraine's Economy in the Conditions of Globalization
3	<b>Yoshio Matsuki and Petro Bidyuk</b>	Strategy of Economic Development: a Proposal for Ukraine upon Econometrics of Geometry
4	<b>Viktoriiia Dergachova, Viktoriiia Holiuk and Nataliia Kuzminska</b>	Synchronization of Business Cycles of Ukraine and its Neighbor Countries
5	<b>Olga Zhukovska</b>	Decision-Making Model on Potential Borrower Lending for Independent Experts Group
6	<b>Nikita Mazurenko and Ivan Fartushnyi</b>	Studying Cyclicity in Small Economic System Using Imitational Modeling
7	<b>Oleg Kaminsky, Julia Yereshko, Maryna Kravchenko and Kateryna Boiarynova</b>	The Model of Additive Manufacturing Business-Ecosystem in the Conditions of War in Europe
8	<b>Serhiy Kyryienko</b>	Kepler's Data Mining and Calendar Reform

9	<b>Zhanna Zhygalkevych, Yuliia Vorzhakova, Yana Koleshnya and Anna Dergachova</b>	Influence of the Digital Economy on the Innovative Development of Enterprises
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**06.10.2020**

**ORAL SESSIONS**  
(10:00 – 14:00)

**TRACK 1: System Analysis of Complex Systems (SACS)**

<b>Moderator</b>		<b>I.O. Savchenko</b>
1	<b>Michael Zgurovsky, Kostiantyn Yefremov, Ivan Pyshnograiev, Andrii Boldak and Iryna Dzhygyrey</b>	Quality and Security of Life: A Cross-Country Analysis
2	<b>Abdel-Badeeh Salem, Walaa Gad, Alhasan Alkuhlani and Mohamed Roushdy</b>	O-glycosylation Site Prediction Using Random Forest Importance and Support Vector Machine
3	<b>Oleksandr Nakonechnyi, Iuliia Shevchuk, Natalia Rusina, Iryna Vergunova, Sofiia Myrvoda and Mykyta Vertelko</b>	Estimation of SIRM Model's Nonstationary Parameters of COVID-19 in Czech Republic
4	<b>Anastasiia Chuchvara, Olha Chernukha and Yurii Bilushchak</b>	The Model of Diffusion Processes in a Two-Phase Strip with Randomly Disposed Spherical Inclusions Near the Mass Source on the Body Surface
5	<b>Iurii Kaliukh, Anatolii Sirenko, Olena Voloshkina, Iryna Korduba, Artem Honcharenko and Anastasiya Kovaliova</b>	Complex Research and Implementation of the IoT System for the Residential Buildings Vibration Protection
6	<b>Nataliia Kuzmenko, Ivan Ostroumov, Yurii Bezkorovainyi, Yuliya Averyanova, Vitalii Larin, Olha Sushchenko, Maksym Zaliskyi and Oleksandr Solomentsev</b>	Airplane Flight Phase Identification Using Maximum Posterior Probability Method
7	<b>Liubov Smoliar, Nataliia Koba and Maksym Koba</b>	Clusterization as a Factor of Business Development in Transport-Logistic Sphere
8	<b>Oleksandr Laptiev, Serhii Yevseiev, Andrii Trystan, Valerii Chystov, Olha Matiushchenko and Iryna Zakharchenko</b>	Solving the Problem of Convergence of the Results of Analog Signals Conversion in the Process of Aircraft Control
9	<b>Nataliia Kruglova and Oleksandr Dykhovychnyi</b>	Choosing MIRT Model for Analysis of Quality of Pedagogical and Psychological Tests
10	<b>Olexandr Stanzhyts'kyi, Andrii Pankov, Tetiana Shovkoplias, Vadym Mukhin</b>	Solving Optimal Control Problems on Finite and Infinite Intervals



<b>TRACK 2: Methods, Tools, and Applications of Systems Mathematics (MTASM)</b>		
<b>Moderator</b>		P.O. Kasyanov
1	<b>Oleh Perehuda, Farhod Asrorov, Viktoria Mogylova and Oksana Kovtun</b>	Qualitative Analysis of Equations Perturbed by Random Processes of "White Noise"
2	<b>Sergiy Prykhodko and Natalia Prykhodko</b>	A Statistical Technique to Construct Data-Driven Decision Rules Based on Prediction Intervals of Nonlinear Regressions
3	<b>Alexander Kutsenko, Svitlana Kovalenko and Sergii Kovalenko</b>	Development and Generalization of the Main Provisions of Equilibrium Thermodynamics Applied to General Quasi-Static Systems
4	<b>Oleksandr Makarenko and Anton Popov</b>	Computer Complex for Modeling Nonlinear Hyperbolic Equations of Second Order
5	<b>Vladimir Lukin, Irina Vasilyeva and Benoit Vozel</b>	Results of Approbation of the Method for Predicting the Classification Accuracy of Multichannel Images
6	<b>Oleksandr Kuzenkov, Victor Busher, Oleksii Chorny, Anatoliy Nikolenko, Vitaliy Kuznetsov and Oleksandr Savvin</b>	Nonlinear Analysis of Bifurcatory Properties of Mathematical Model of Subpopulation Dynamics in the Case of a Single Niche for Subpopulation
7	<b>Artem Zinchenko</b>	Investigation of Bifurcation Transitions to Deterministic Chaos in Nonlinear Dynamic Systems
<b>TRACK 3: Computational Intelligence (CI)</b>		
<b>TRACK 4: Intelligent Computing Technologies (ICT)</b>		
<b>Moderator</b>		Y.P. Zaychenko
1	<b>Anatolii Petrenko</b>	Tools for Digitalization of Public and Economic Services
2	<b>Yurii Kharkevych, Oleg Mukhin, Uliana Hrabova, Andriy Makarchuk, Inna Kal'Chuk and Galyna Kharkevych</b>	Application of the Continuous Fourier Transformation in Signal Theory
3	<b>Iuliia Lysenko, Yurii Kuts, Valentin Uchanin, Anatoliy Protasov, Valentyn Petryk and Alexander Alexiev</b>	Intelligent Automated Eddy Current System for Monitoring the Aircraft Structure Condition
4	<b>Andriy Dudnik, Yurii Kravchenko, Oleksandr Trush, Olga Leshchenko, Natalia Dahno and Yulia Ryabokin</b>	Routing Method in Wireless IoT Sensor Networks

5	<b>Vira Shendryk, Yuliia Parfenenko, Yevhen Kholiavka, Petro Pavlenko, Oleksandr Shendryk and Larysa Bratushka</b>	Short-term Solar Power Generation Forecasting for Microgrid
6	<b>Anastasiia Ivanytska, Liudmyla Zubyk, Andriy Dudnik, Dmitry Gololobov, Oleh Kurchenko and Denis Berestov</b>	Evaluation of the Effectiveness of Information Technology Methods for Processing Diagnostic Information Based on Complex Data
<b>TRACK 5: Data Mining for Complex Socio-Economic Processes and Systems (DMCSEPS)</b>		
<b>Moderator</b>		P.I. Bidyuk
1	<b>Valentina Marchenko, Nikola Milović, Alla Hrechko, Olena Korohodova, Bogdan Dergaliuk and Daker Elrabay'a</b>	Impact of Migration Processes on Changes in the Volume and Redistribution of Municipal Waste in European Countries
2	<b>Olga Tsesliv</b>	Economical and Mathematical Methods of Project management
3	<b>Olha Ilyash, Liubov Smoliar, Olena Shevchuk, Olena Trofymenko, Tetiana Pavlenco and Pavlo Blokhin</b>	Phenomenological Assessment of the Interconnection between the Economic Security Components of the Temporarily Occupied Donetsk and Luhansk Regions, and Ukraine
4	<b>Valeriy Volosyuk, Simeon Zhyla, Vladimir Pavlikov, Dmytro Vlasenko, Olha Inkarbaieva and Denys V. Kolesnikov</b>	Heuristic Structures of Cognitive Aerospace Remote Sensing Radars
5	<b>Valeriy Volosyuk, Simeon Zhyla, Dmytro Vlasenko, Olha Inkarbaieva, Denys V. Kolesnikov and Gleb Cherepnin</b>	Concepts of Primary and Secondary Coherent Images in Radar and Optical Systems
6	<b>Valeriy Volosyuk, Simeon Zhyla, Vladimir Pavlikov, Denys V. Kolesnikov, Eduard Tserne and Olha Inkarbaieva</b>	Method of Static Synthesis of Aperture in Tasks of Remote Sensing and Non-Destructive Testing
7	<b>Michael Zgurovsky, Maryna Kravchenko, Kateryna Boiarynova, Kateryna Kopishynska and Ivan Pyshnograiev</b>	The Energy Independence of the European Countries: Consequences of the Russia's Military Invasion of Ukraine