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Editorial Note

International Workshop on Modern Problems of Analysis, Optimization, Approximation and Their Applications (IWMPAOATA)

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ABSTRACT. The guest editor provides an overview of the International Workshop on Modern Problems of Analysis, Optimization, Approximation and Their Applications (IWMPAOATA), held on 25–27 June 2025 at International Telematic University UNINETTUNO, Rome, Italy, as part of the Erasmus+ program, summarizing its objectives, scope, scientific aims, and the key highlights of the event. The workshop brought together Italian, Ukrainian and international mathematicians who presented results on such scientific topics as linear and nonlinear functional analysis, function theory, approximation theory, numerical analysis, and optimization theory. The note briefly introduces the papers included in this special issue of the ALTAY Conference Proceedings in Mathematics, which reflect current advances in mathematics.

1. REPORT ON THE CONFERENCE

The International Workshop on Modern Problems of Analysis, Optimization, Approximation and Their Applications (IWMPAOATA) was held on 25–27 June 2025 at International Telematic University UNINETTUNO, Rome, Italy. The event provided insight into scientific collaboration between Italy and Ukraine, and also highlighted Europe's support for cooperation through the Erasmus+ program. In total, 75 participants from 8 countries took part in the workshop, including 49 speakers.

The scientific program covered a wide range of topics, including linear and nonlinear functional analysis, function theory, approximation theory, numerical analysis, optimization theory, and their applications to real-world problems.

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The event was hosted by Prof. Clemente Cesarano and Prof. Roman Dmytryshyn with the support of the Organizing and Scientific Committees. Further details, including the complete program and abstracts, are available on the official website: `https://sites.google.com/uninettunouniversity.net/iwmpaoata/home?authuser=0`

2. Introducing the Special Issue

The papers published in this special issue of the ALTAY Conference Proceedings in Mathematics originate from the International Workshop on Modern Problems of Analysis, Optimization, Approximation and Their Applications (IWMPAOATA), held on 25–27 June 2025 at International Telematic University UNINETTUNO, Rome, Italy.

Following the workshop, the participants were invited to submit extended versions of their presented works to this special issue. After a rigorous peer-review process, the following papers have been accepted for publication:

- *Computational aspects of approximating the Horn hypergeometric functions H_3 by branched continued fractions*, by Marta Dmytryshyn, Sofiia Hladun, Mykhailo Holod, and Volodymyr Hladun. This paper investigates the approximation of the Horn hypergeometric function H_3 using its expansion into the branched continued fraction.
- *Mathematical modelling of control-loss detection via risk-sensitive reinforcement learning on partially observable Markov decision processes*, by Oleksandr Chaban and Volodymyr Hladun. The paper presents a method for identifying high-risk loss-of-control episodes in digital settings by combining risk-sensitive reinforcement learning with decision-making under partial observability.
- *Truncation error bounds of branched continued fraction expansions of special ratios of Horn's hypergeometric functions H_4*, by Roman Dmytryshyn, Clemente Cesarano, and Ilona-Anna Lutsiv. The paper establishes the truncation error bounds for the branched continued fraction extensions of some Horn's hypergeometric function H_4 ratios with real parameters and variables.
- *Maximum modulus of slice entire regular functions of quaternionic variable with bounded index*, by Vita Baksa, Andriy Bandura, and Oleh Skaskiv. The paper contains new results describing local behavior of slice entire regular functions of quaternionic variable.
- *About Borel type relation for some positive integrals*, by Andriy Bandura, Andriy Bodnarchuk, and Oleh Skaskiv. The paper describes asymptotic behavior of functions which are represented by integrals of the form

$$F(x) = \int_0^{+\infty} a(t) f(x+t) \nu(dt),$$

  where ν is locally finite measure on $\mathbb{R}_+$, a is positive ν-measurable function, f is positive and increasing to $+\infty$ in $[0, +\infty)$ function such that $f(0) = 1$ and $\ln f(x)$ is a convex on the interval $[0, +\infty)$ function.
- *Approximation characteristics of Stepanets–Orlicz type spaces*, by Andrii Shydlich. The paper presents the spaces $\mathcal{S}_{M,\Phi}$ and shows their connection with the well-known Stepanets spaces $\mathcal{S}^p_\Phi$, Orlicz spaces $\mathcal{S}_M$, and others.

3. Acknowledgements

We express our sincere gratitude to all members of the Organizing and Scientific Committees for their efforts in making the conference a success. Special thanks are extended to all reviewers for their valuable time and constructive comments, which significantly improved the quality of the published papers.

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