

INTERNATIONAL BIWEEKLY ONLINE SEMINAR ON ANALYSIS, DIFFERENTIAL EQUATIONS AND MATHEMATICAL PHYSICS

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The Energy Spreading PONS Transform and its Applications

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PONS, the Prometheus Orthonormal Set, is a suite of digital signal processing and data transmission algorithms whose genesis is found in a generalization of the Shapiro Polynomials. We begin with an overview of the mathematical and energy spreading features of PONS and then discuss a "Global Uncertainty Principle", which was the initial motivation for the PONS construction. Then we describe the elementary yet elegant construction by Harold Shapiro of his polynomials, and show the straightforward generalization of this construction which yields the PONS sequences and polynomials. After briefly comparing PONS with the Walsh Functions we outline possible mathematical interpretations of Energy Spreading. We conclude with a live demonstration showing the extreme robustness of PONS-transformed digital signals to noise and loss in a transmission channel.

*Seminar website: <https://msrn.sfedu.ru/sl>. The seminar uses Microsoft Teams online platform. Please send questions to ademp.seminar@gmail.com (Tatiana Andreeva, scientific secretary).

The seminar is organized by the coordinators Alexey Karapetyants and Vladislav Kravchenko within the activities of the Regional Mathematical Center of the Southern Federal University in collaboration with Institute of Mathematics, Mechanics and Computer Sciences of the Southern Federal University and the OTHA research group in Operator Theory and Harmonic Analysis.



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