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

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12 November 2026, 6 pm (UTC+3)

A new approach to the regularization of singular differential expressions with distributional coefficients

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We introduce a concise operator-differential expression, which will be shown to contain, among other things, various singular ordinary differential expressions with coefficients in negative Sobolev spaces. Besides providing a convenient new representation, this creates an alternative to the Mirzoev–Shkalikov regularization for such singular differential expressions, which is based on constructing the so-called compatible matrix in the Shin–Zettl class. In particular, our approach allows us to obtain a complete description of all possible compatible matrices and gives an opportunity to establish the completeness of the eigen- and associated functions of the corresponding operators with general irregular separated boundary conditions, the expansion issues for which have not yet been studied. The talk is based on the recent paper [1].

[1] Buterin S.A. Operator-differential expressions: regularization and completeness of the root functions, Sb. Math., 217:7 (2026), 915–959, https://doi.org/10.4213/sm10376e.

*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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