Women in Mathematics in South-Eastern Europe
December 11 – 13, 2024, Sofia, Bulgaria

Some Generalizations of the Schrödinger Equation

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In the talk, I will give an overview of our recent works related to some generalized forms of the Schrödinger equation, providing analytically solvable models for application in quantum mechanics. In the first part of the talk, solutions of the Schrödinger equation containing a generalized non-integer form of the Laplacian operator will be presented. Then, we will pay attention on the fractional Schrödinger equation, pointing out physical examples where the time-fractional Schrödinger equation naturally emerges under certain geometric constraints. In both parts, the special functions appearing in the closed-form solutions will be extensively analyzed.

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