Applications of Computer Algebra – ACA 2021
Virtual. Online | July 23-27, 2021
Session on *"Computer Algebra for Geometry and Combinatorics"*

The usage of Maple in solving Schrödinger's wave equation for an optical atom model

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Steinberg in [1,2], introduced a method for solving certain types of partial differential equations. The method is based on the use of the Lie algebraic decomposition techniques, which exploits a faithful matrix representation of least degree of the Lie algebra. The method was applied to many models in quantum optics.

Recently, in [3], the method was used to solve the Schrödinger's wave equation of the two-level optical atom model. Faithful matrix representation of this model, and others, were assisted by the Maple packages. Maple also, was very useful in utilizing the solution of the wave function for presenting the graphs of the atomic localization in the coordinate space. Generalizations of the model in [3], to the q-deformed Lie algebra of possible faithful matrix representations [4] is outlined.

Keywords
Lie algebra, faithful representation, Schrödinger's wave equation, optical atom model.

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