Abstract Submitted
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Symmetry analysis of the quantum oscillator BALRAJ MENON, University of Central Arkansas — The symmetry analysis of differential equations had its beginnings at the end of the nineteenth century in the work of the Norwegian mathematician Sophus Lie, and arose in his investigation of solutions of differential equations. The applications resulting from the explicit determination of the symmetries of a differential equation are numerous. They include, the construction of new solutions of a differential equation from known solutions, the construction of special solutions of the differential equation, and in the interplay between symmetries and conservation laws, enshrined in the celebrated theorems of the German mathematician Emmy Noether. This talk primarily focusses on the task of determining the symmetries of a differential equation and the application of the method to the quantum oscillator. Some novel and interesting time-dependent solutions of the quantum oscillator generated by the symmetry analysis are presented and their significance discussed. The mathematical formalism underlying the symmetry analysis is accessible to undergraduates with a knowledge of multivariate calculus and some exposure to differential equations. The symmetry analysis of differential equations is a fruitful area of research for the theoretically inclined undergraduate, encompassing areas such as the analysis of PDEs, computer algebra and computer visualization.

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