Special Issue

Harmonic Oscillators and Two-by-two Matrices in Modern Physics

Message from the Guest Editor

From a mathematical point of view, modern physics is the physics of harmonic oscillators and two-by-two matrices. The oscillator's role in the development of quantum mechanics is well known. Since then, the harmonic oscillator played the major roles in the formulations of the Fock space in quantum field theory, quantum optics, superconductivity, atomic and molecular physics, among others. As for two-by-two matrices, the role of the three Pauli matrices is well known. These three Pauli matrices are Hermitian. Often forgotten is the fact that there are also three two-by-two anti-Hermitian matrices. These six matrices constitute the complete set of generators for the most general form of two-by-two matrices with unit determinant. The group of these six-parameter matrices is known as the group SL(2,c).....

Guest Editor

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Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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