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Symmetry in Orthogonal Polynomials

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Deadline for manuscript submissions:
closed (16 August 2016)

Message from the Guest Editor

The concept of symmetry has been fundamental and studied for millennia. The ancient geometers already knew the five regular solids. For a long time, symmetry was a part of the discipline of geometry, but in more recent times it has become very important in analysis, mathematical physics, and of course, group theory. Symmetry is a key tool in analyzing functions of several variables. For example, the harmonic homogeneous polynomials, which are invariant under the group of rotations fixing the North Pole on the unit sphere in are essentially the same as Gegenbauer polynomials of index N/2−1. By now, this idea has been vastly generalized, for example, to interpreting Jacobi polynomials of several variables (defined on a simplex and orthogonal with respect to a Dirichlet measure) as harmonic polynomials with certain subgroup invariance properties.

In mathematical physics there are the quantum-mechanical models of Calogero–Moser–Sutherland type: N identical particles with $1/r^2$ interaction and possibly an external potential, of which wavefunctions involve Jack polynomials[...]

mdpi.com/si/5282

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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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