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On q-analogues of the quantum harmonic oscillator and the quantum group $SU(2)_q$. (English)

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J. Phys. A, Math. Gen. 22, No. 21, 4581-4588 (1989).

From the introduction: "Here we wish to generalize to $SU(2)_q$, the simplest quantum group, the q-deformation of the Lie algebra of $SU(2)$, Schwinger's approach [*J. Schwinger*, On angular momentum', in 'Quantum Theory of Angular Momentum (ed. by L. C. Biedenharn and H. van Dam), Academic Press, 1965, p. 229-279] to the quantum theory of angular momentum. To achieve this, a q-deformation of the quantum harmonic oscillator formalism has to be developed. Much of the present paper is devoted to this task. Then the algebra of $SU(2)_q$, and its representations can be realized in terms of the variables of two independent q-deformed harmonic oscillators. Our results involve explicit coordinate of wavefunctions representations as well as abstract Hilbert space versions."

Reviewer: V.Pestov (Novosibirsk)

MSC:

- 17B37 Quantum groups (quantized enveloping algebras) and related deformations
- 81R50 Quantum groups and related algebraic methods applied to problems in quantum theory
- 53D50 Geometric quantization

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Keywords:

quantum group; Schwinger's approach; q-deformation; quantum harmonic oscillator; wavefunctions representations

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