

UWM Math Colloquium

Friday, October 12, 2007, 4:00 PM, EMS E495A

"Common generating functions for complete wave functions of hydrogen atom in 2, 3 and 4 dimensions"

by

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Abstract:

The work in two dimensions shows that the Schroedinger equation for the hydrogen atom has integrable solutions in circular, parabolic and elliptical coordinates. The common generating function in parabolic coordinates is formally like the generating function for a two-dimensional harmonic oscillator in Cartesian coordinates. The rewriting of the generating function in circular and elliptical coordinates leads to its expansions in terms of the respective hydrogen-atom wave functions (L. Chaos-Cador and E. Ley-Koo International Journal of Quantum Chemistry 107, 12-22, 2007).

Similarly, the common generating function for the three-dimensional hydrogen atom in parabolic coordinates is like the product of generating functions of two harmonic oscillators in circular coordinates. Its expansions render also the wave functions in spherical, spheroconal and spheroidal coordinates.

Preliminary results for the four-dimensional hydrogen atom will also be reported.

Refreshments: 3:30 pm, EMS E495A