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→ THE BOOK OF ABSTRACTS ←

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(alphabetical ordering)

Francisco M. Fernández

On the eigenvalues of some nonhermitian oscillators

We consider a class of one-dimensional nonhermitian oscillators and discuss the relationship between the real eigenvalues of PT-symmetric oscillators and the resonances obtained by different authors. We also show the relationship between the strong-coupling expansions for the eigenvalues of those oscillators. Comparison of the results of the complex rotation and the Riccati-Padé methods reveals that the optimal rotation angle converts the oscillator into either a PT-symmetric or an Hermitian one. In addition to the real positive eigenvalues the PT-symmetric oscillators exhibit real positive resonances under different boundary conditions. They can be calculated by means of the straightforward diagonalization method. The Riccati-Padé method yields not only the resonances of the nonhermitian oscillators but also the eigenvalues of the PT-symmetric ones.

Work done with Javier Garcia

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Vladimir P. Gerdt:

Singular field theories, Lagrangean constraints and Thomas decomposition

In the talk we consider a field theory whose Lagrangian density L is a polynomial in the dependent (field) variables and their first-order derivatives in the spatial variables and in the temporal variable. The theory is singular or constrained if the Hessian matrix H is singular, and there are primary Lagrangean constraints [1]. The consistency of time evolution of the primary constraints with the Euler-Lagrange equations may lead to new constraints. Then, their consistency analysis may lead to further constraints, etc. We show that the differential Thomas decomposition [2] of the Euler-Lagrange equations is a universal algorithmic tool for computation of the full set of Lagrangean constraints.

References

[1] A.Wipf. Hamiltons Formalism for Systems with Constraints. In: "Canonical Gravity: From Classical to Quantum" (J. Ehlers and H. Friedrich, eds.), Springer-Verlag, New York, 1994, pp. 22-58. arXiv:hep-th/9312078

[2] T.Bächler, V.P.Gerdt, M.Lange-Hegermann and D.Robertz. Algorithmic Thomas Decomposition of Algebraic and Differential Systems. Journal of Symbolic Computation, 47 (2012), 1233.1266. arXiv:math.AC/1108.0817

Peter G. L. Leach:

Dirac and Hamilton.

Dirac devised his theory of Quantum Mechanics and recognised that his operators resembled the canonical coordinates of Hamiltonian Mechanics. This gave the latter a new lease of life. We look at what happens to Dirac's Quantum Mechanics if one starts from Hamiltonian Mechanics.

Jan Paseka

On Realization of Partially Ordered Abelian Groups

The lecture is devoted to algebraic structures connected with the logic of quantum mechanics. Since every (generalized) effect algebra with an order determining set of (generalized) states can be represented by means of an abelian partially ordered group and events in quantum mechanics can be described by positive operators in a suitable Hilbert space, we are focused in a representation of partially ordered abelian groups by means of sets of suitable linear operators.

We show that there is a set of points separating R-maps on a given partially ordered abelian group G if and only if there is an injective non-trivial homomorphism of G to the symmetric operators on a dense set in a complex Hilbert space H which is equivalent to an existence of an injective non-trivial homomorphism of G into a certain power of R. A similar characterization is derived for an order determining set of R-maps and symmetric operators on a dense set in a complex Hilbert space H. We also characterize effect algebras with an order determining set of states as interval operator effect algebras in groups of self-adjoint bounded linear operators.

Ingrid Rotter

Transition from level repulsion to width bifurcation in open quantum systems.

The continuation of the previous studies together with H. Eleuch.