
Galoisian Analysis of Schrödinger Equations with Generalized Lennard-Jones Potentials

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Abstract

In this talk it will be presented a proof of non-integrability, through Liouvillian functions, of Schrödinger equations with Lennard-Potential 6 – 12 using differential Galois theory. A generalization of Lennard-Jones potentials, given by

$$V(r) = -\frac{A}{r^m} + \frac{B}{r^{2m-2}},$$

is analysed with differential Galois theory to obtain integrability of the Schrödinger equations with these potentials. In particular, we obtain Liouvillian solutions whenever $m = 6$, which is very closed to the classical Lennard-Jones potentials.

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