

Integrable and Superintegrable Systems in Quantum Mechanics on a Lattice

ZDENĚK KABÁT

ČVUT, Praha, Fakulta jaderná a fyzikálně inženýrská

In this thesis, we make a summary of Lie symmetries of differential equations, umbral calculus and Smorodinsky-Winternitz superintegrable systems in the Euclidean plane. We use the umbral correspondence for isospectral discretization of these systems to the orthogonal lattice. This method allows us to preserve the integrability, symmetry algebras and to obtain the formal solutions of the Schrödinger equation. Moreover we discretize the gauge-rotated Hamiltonians which preserves the polynomiality of the solutions. This work will be also used as student's diploma thesis.