



QUASICLASSICAL AND QUANTUM SYSTEMS OF ANGULAR MOMENTUM. PART II. QUANTUM MECHANICS ON LIE GROUPS AND METHODS OF GROUP ALGEBRAS

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Abstract. In Part I of this series we have presented the general ideas of applying group-algebraic methods for describing quantum systems. The treatment there was very “ascetic” in that only the structure of a locally compact topological group was used. Below we explicitly make use of the Lie group structure. Relying on differential geometry one is able to introduce explicitly representation of important physical quantities and to formulate the general ideas of quasiclassical representation and classical analogy.

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1. Introduction

This paper is a continuation of Part I referred further as [25] and is devoted to the H^+ -algebras as a mathematical tool for describing quantum mechanics. It was shown there that the H^+ -algebras form in a sense a beautiful scheme useful for the mathematical expression of quantum rules and for the very formulation of quantum ideas. This is due to their mathematical structure which in a sense unifies both the linear space and the non-commutative associative algebra with involution. The idea of using the H^+ -algebras in such a context was formulated many years ago