

GREEN'S FUNCTION FOR 5D $SU(2)$ MIC-KEPLER PROBLEM

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Abstract. The Green's function for 5-dimensional counterpart of the MIC-Kepler problem (Kepler potential plus $SU(2)$ Yang–Mills instanton plus Zwanziger-like $1/R^2$ centrifugal term) is constructed on the basis of the Green's function for the 8-dimensional harmonic oscillator.

1. Introduction

Coulomb Green's functions in a n -dimensional Euclidean space have been constructed in [1]. The results for the cases $n = 2, 3, 5$ can be deduced from the oscillator Green's functions in $N = 2, 4, 8$ dimensions due to Levi-Civita, Kustaanheimo–Stiefel [2] and Hurwitz transformations [3], respectively.

Moreover [4], the $N = 4$ oscillator representation allows to obtain Green's function for 3-dimensional MIC-Kepler problem [5] (Kepler–Coulomb potential plus $U(1)$ Dirac monopole plus Zwanziger's [6] $1/R^2$ centrifugal term).

In this paper we construct the Green's function for 5-dimensional counterpart of the MIC-Kepler problem [7] (Kepler potential plus $SU(2)$ Yang–Mills instanton plus Zwanziger-like $1/R^2$ centrifugal term). We avoid a tedious procedure of path integration and deduce our result from the well-known expression for the 8-dimensional oscillator Green's function by exploiting the Hurwitz correspondence between these 5- and 8-dimensional problems [7–9].