

THE SPECTRUM OF THE LAPLACE OPERATOR ON CONNECTED COMPACT SIMPLE LIE GROUPS OF RANK FOUR

I. A. Zubareva

In the present article, we explicitly compute the spectrum of the Laplace operator on smooth real-valued and complex-valued functions on connected compact simple Lie groups of rank four with a bi-invariant Riemannian metrics that correspond to the root systems B_4 , C_4 , and D_4 . We also find a connection between the obtained formulas, number theory, and integral quadratic forms in two, three, and four variables.

Key words and phrases: Laplace operator, spectrum, group representation, Killing form, quadratic forms.

Zubareva Irina Alexandrovna

Sobolev Institute of Mathematics,
Omsk Division,
Omsk, 644099 Russia.
E-mail: i_gribanova@mail.ru

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