SPECTRAL ANALYSIS OF LAPLACE-BELTRAMI OPERATOR ON RIEMANNIAN MANIFOLDS

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The Laplace-Beltrami operator is one of the most important geometric characteristics of a manifold. In the general case, its direct calculation is an extremely difficult task, with the exception of some rare cases.

Keywords: mathematics, differential equations, spectral theory

One of such cases, as this article proves, is the class of Riemannian manifolds. In this article we consider the Laplace-Beltrami operator over a smooth Riemannian manifold with smooth compact boundary. During the study, examples of constructing the Laplace-Beltrami operator are given. Further we will consider the case of the Laplace-Beltrami operator (Laplacian) defined on the set of real or complex functions of a compact Riemannian manifold. The most important concept is symmetrical spaces. These spaces are defined as pseudo-spaces. It is enough that the tensor of its curve is invariant for the connected Riemannian manifolds to be symmetrical. For a general Riemannian manifolds to be symmetric, each point must exist in the form of isometry. Although Riemannian spaces were used in physics, mathematics, and chemistry, their most important role was identified in the theory of homology.

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