ROCKY MOUNTAIN
JOURNAL OF MATHEMATICS
Volume 16, Number 3, Summer 1986

THE INFLUENCE OF THE SPECTRUM OF THE SYMMETRIZED FOURTH ORDER OPERATOR ON THE GEOMETRY OF A RIEMANNIAN MANIFOLD

GR. TSAGAS

1. Introduction. Let (M, g) be a compact Riemannian manifold of dimension n, $\dim M = n$. Let Δ be the Lapalace operator which acts on the algebra $C^\infty(M)$. We denote by $\mathrm{Sp}(M, g)$ the spectrum of Δ on $C^\infty(M)$. The influence of $\mathrm{Sp}(M, g)$ on the geometry on (M, g) is treated in **[6]** and **[16]**.

There are other operators of higher order which act on the algebra $C^\infty(M)$. These operators have a spectrum which is related to the geometry on (M, g).

The aim of the present paper is to study the influence of the spectrum of a special fourth order operator, which is called the symmetrized fourth order Laplace operator on the geometry of a compact Riemannian manifold.

The whole paper contains seven paragraphs. The second paragraph gives the definition of the symmetrized fourth order Laplace operator and some properties. The coefficients of the asymptotic expansion of a function which is constructed by the spectrum of the operator are computed in the third paragraph. The fourth paragraph studies the influence of the spectrum of this symmetrized fourth order Laplace operator on the geometry of a compact Riemannian manifold. The fifth paragraph deals with special compact Riemannian manifolds whose geometry is determined by the spectrum of this Laplace operator.

The sixth paragraph deals with the influence of this symmetrized fourth order Laplace operator on the geometry of a compact Kahler manifold.

The last paragraph studies special compact Kahler manifolds whose geometry is determined by the spectrum of this symmetrized fourth order Laplace operator.

2. Let (M, g) be a compact Riemannian manifold whose dimension is n. Let P be a point of the manifold M. We consider a normal coordinate system $(x_1, \ldots, x_n)$ at the point P of M. This normal coordinate system covers an open neighborhood U of M with center the point P. Let $(y_1,$

Received by the editors on November 19, 1984.