ON THE JACOBI DIFFERENTIAL OPERATORS ASSOCIATED TO MINIMAL ISOMETRIC IMMERSIONS OF SYMMETRIC SPACES INTO SPHERES III

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Contents

Introduction

This is a continuation of our first and second papers [5]. In this paper we shall study on the spectra of the Jacobi differential operator $\tilde{S}$ for minimally immersed spheres into spheres.

Computing the matrix expressions of the linear mappings S_σ, defined in subsection 5.2 of our first paper [5], we show that every eigenvalue of the Jacobi differential operator $\tilde{S}$ is an algebraic number (Theorem 10.4.4, 11.4.4 and 12.3.3), however not a rational number in general. This suggests us that $\tilde{S}$ will not be described only by Casimir operators. We give a lower bound for the nullity of $\tilde{S}$(Theorem 10.6.2 and 11.6.2). In particular, for the minimally immersed 2-dimensional sphere S^2, the nullity is explicitly computed (Theorem 12.4.1) and we show that the nullity is equal to twice the Killing nullity (Theorem 12.4.3).

We shall denote by [I] (resp. by [II]) our first paper [5] (resp. our second paper [5]) for short. We retain the definitions and notation in [I] and [II].

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10. Minimal immersions of $(2h-1)$-dimensional sphere $S^{2h-1}(h \geq 2)$

In this section we assume that $G=SO(2h)$ and $K=SO(2h-1)$, $h \geq 2$. The assumptions and the notation are the same as in section 9 of [II]. And in this paper, we will not distinguish G-modules and representations of G.