A STUDY OF SPECIAL WEINGARTEN HYPERSURFACES IN $\mathbb{R}^4$ WITH SPHERICAL FOLIATIONS

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We investigate hypersurfaces in the Euclidean four-space $\mathbb{R}^4$ that are foliated by portions of spheres and satisfy a Weingarten relation of the form $a\mathbb{K}_1 + b\mathbb{K}_2 + c\mathbb{K}_3 = d$, where a, b, c, and d are constants. In this relation, $\mathbb{K}_1$, $\mathbb{K}_2$, and $\mathbb{K}_3$ denote the mean curvature, the second curvature, and the Gauss–Kronecker curvature, respectively.

Contents

1. Introduction

Several studies have investigated the geometric properties of surfaces and hypersurfaces, as well as related variational problems, in various space forms.

For instance, Aulisa *et al* [3] presented new developments on the *p*-Willmore energy of surfaces. Atampalage, Athukorallage, and Toda [1] studied doubly connected minimal surfaces between two circles in parallel planes. Aulisa, Gruber, and Toda [2] discussed generalized Willmore energies and their applications. The geometry of hypersurfaces in four-dimensional spaces has also been explored through