

Self-dual Centroaffine Surfaces of Codimension Two with Constant Affine Mean Curvature*

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Abstract

We explicitly determine the self-dual centroaffine surfaces of codimension two with constant affine mean curvature and indefinite affine fundamental form by giving representation formulas.

1 Introduction

An immersion f of an n -dimensional manifold M into $\mathbb{R}^{n+2} \setminus \{0\}$ is called a *centroaffine immersion of codimension two* if the position vector $f(x)$ is transversal to f_*T_xM at each point x of M . Properties of such immersions invariant under special linear transformations were first studied by Walter [5], and later by Nomizu and Sasaki [3] in a more general and systematic way, particularly from the viewpoint of its closed connection with projective hypersurface theory.

For a given centroaffine immersions f of codimension two, one of the most fundamental results established by them is: if f is non-degenerate, then f uniquely determines a pseudo-Riemannian metric on M , called the *affine fundamental form* of f ; moreover, the affine fundamental form is invariant under the change $f \mapsto Af$ of centroaffine immersions by an element A of $SL(n+2; \mathbb{R})$.

In [2], the first author considered a certain area-variational problem with respect to the affine fundamental form and studied its extremals, which he called *minimal centroaffine immersions*. Furthermore, he showed that the space of the $SL(4; \mathbb{R})$ -congruence classes of minimal ISDC immersions $\mathbb{R}^2 \rightarrow \mathbb{R}^4 \setminus \{0\}$ is in one-to-one

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