On a class of submanifolds in $\mathbb{S}^n \times \mathbb{R}$ and $\mathbb{H}^n \times \mathbb{R}$

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Abstract

Given an isometric immersion $f : M^m \to \mathbb{Q}^n_\epsilon \times \mathbb{R}$, where $\mathbb{Q}^n_\epsilon$ denote either the unit sphere $\mathbb{S}^n$ or the hyperbolic space $\mathbb{H}^n$, according as $\epsilon = 1$ or $\epsilon = -1$, respectively, let ∂_t be a unit vector field tangent to the second factor. Then, a tangent vector field T on M^m and a normal vector field η along f are defined by

$$\partial_t = f_* T + \eta. \tag{0.1}$$

Let $\mathcal{A}$ denote the class of isometric immersions $f : M^m \to \mathbb{Q}^n_\epsilon \times \mathbb{R}$ with the property that T is an eigenvector of all shape operators of f. In this talk we will discuss some important subclasses of $\mathcal{A}$, such as submanifolds with constant sectional curvature [3], rotational submanifolds [1], constant angle hypersurfaces [6] and, with more detais, recent works about biconservative submanifolds with parallel mean curvature vector field [2], [4].

References

[1] F. Dillen, J. Fastenakels, J. Van der Veken, *Rotation hypersurfaces in* $\mathbb{S}^n \times \mathbb{R}$ *and* $\mathbb{H}^n \times \mathbb{R}$, Note di Matematica **29**, 41–54, (2008).

[2] D. Fectu, C. Oniciuc, A. L. Pinheiro, *CMC biconservative surfaces in* $\mathbb{S}^n \times \mathbb{R}$ *and* $\mathbb{H}^n \times \mathbb{R}$, J. Math. Anal. Appl. **425** (2015), 588–609.

[3] F. Manfio, R. Tojeiro, *Hypersurfaces with constant sectional curvature in* $\mathbb{S}^n \times \mathbb{R}$ *and* $\mathbb{H}^n \times \mathbb{R}$, Illinois J. Math., **55**, no. 1, 397–415, (2011).

[4] F. Manfio, N. C. Turgay, A. Upadhyay, *Biconservative submanifolds in* $\mathbb{S}^n \times \mathbb{R}$ *and* $\mathbb{H}^n \times \mathbb{R}$, preprint.

[5] B. Mendonça, R. Tojeiro, *Umbilical submanifolds of* $\mathbb{S}^n \times \mathbb{R}$, Canad. J. Math. **66**, no. 2, 400–428, (2014).

[6] R. Tojeiro, *On a class of hypersurfaces in* $\mathbb{S}^n \times \mathbb{R}$ *and* $\mathbb{H}^n \times \mathbb{R}$, Bull. Braz. Math. Soc. (N. S.) **41**, no. 2, 199–209, (2010).

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