de Lima, Henrique F.; dos Santos, Fábio R.; Rocha, Lucas S.
Sharp Simons type integral inequalities for closed linear Weingarten submanifolds in a space form. (English) Zbl 07493136
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Summary: We prove sharp Simons type integral inequalities for \( n \)-dimensional closed linear Weingarten submanifolds (that is, submanifolds whose scalar and mean curvatures are linearly related) immersed with parallel normalized mean curvature vector field in a Riemannian space form \( Q^{n+p}(c) \) of constant sectional curvature \( c \in \{-1, 0, 1\} \), and we use them to characterize totally umbilical spheres \( S^n(r) \) and, when \( c = 1 \), Clifford tori \( S^1(\sqrt{1-r^2}) \times S^{n-1}(r) \). In our approach, which is based on a suitable lower estimate of a Cheng-Yau modified operator acting on the square norm of the traceless second fundamental form of such a submanifold, we follow the ideas and techniques introduced by Alías and Meléndez in reference [2] for the case of hypersurfaces with constant scalar curvature in the Euclidean sphere.

MSC:
53C42 Differential geometry of immersions (minimal, prescribed curvature, tight, etc.)
53C20 Global Riemannian geometry, including pinching

Keywords:
Riemannian space forms; closed linear Weingarten submanifolds; Simons type integral inequality; totally umbilical spheres; Clifford tori

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References:

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