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Constant scalar curvature hypersurfaces with spherical boundary in Euclidean space. (English) Zbl 1038.53060

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The authors prove the following Theorem 3. Let Σ be a strictly convex compact $(n-1)$-dimensional submanifold contained in a hyperplane $\Pi \subset \mathbb{R}^{n+1}$, and let $\psi : M^n \to \mathbb{R}^{n+1}$ be an embedded compact hypersurface with boundary Σ. Let us assume that, for a given $2 \leq r \leq n$, the r-mean curvature H_r of M is a non-zero constant. Then M is contained in one of the half-spaces of $\mathbb{R}^{n+1}$ determined by Π and M has all the symmetries of Σ.

As a consequence, when a hypersurface has spherical boundary Σ and constant rth mean curvature H_r $(r \geq 2)$, then it is a hyperplanar round ball or a spherical cap (Cor. 4) and, in particular, this is the case when the scalar curvature, $r = n$, is constant (Theorem 1).

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MSC:

53C42 Differential geometry of immersions (minimal, prescribed curvature, tight, etc.)

53A10 Minimal surfaces in differential geometry, surfaces with prescribed mean curvature

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constant scalar curvature; constant mean curvature; Newton transformation; spherical cap; spherical boundary; circular boundary; Gauss curvature

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