On the Halfspace Theorem in the Euclidean Space With Density

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Resumen. The classical *Strong Halfspace Theorem* of Hoffman and Meeks [1] states that a non-flat, properly immersed minimal surface in $\mathbb{R}^3$ cannot be contained within a half-space. This work explores the extension of this theorem to Euclidean space $\mathbb{R}^3$ endowed with a density $f = e^{\phi}$. In this setting, minimal surfaces are replaced by *weighted minimal hypersurfaces*, characterized by the equation

$$H + \langle \nabla \phi, N \rangle = 0,$$

where H is the Euclidean mean curvature with respect to a unit normal N. The existence of a half-space theorem in this context depends crucially on the geometric and analytic properties of the density f. Here we will gather previous related results and seek new conditions ensuring that the theorem holds in this setting.

Palabras clave: half-space theorem; maximum principle; manifolds with density; geometric analysis; minimal surfaces.

References

[1] D. Hoffman, W. H. Meeks III (1990). The strong halfspace theorem for minimal surfaces. *Invent. Math.*, 101, 373–377.

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