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Uniqueness of stable minimal surfaces with partially free boundaries. (English)

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We consider parametric minimal surfaces $X : B \to \mathbb{R}^3$ of disc- type which are stationary in a boundary configuration $\langle T, S\rangle$ consisting of a support surface $S \subset \mathbb{R}^3$ and a Jordan arc Γ with endpoints on S. We introduce the notion of "freely stable minimal surfaces", whose second variation of the area functional is nonnegative with respect to displacements of X keeping the arc Γ fixed and remaining with the support surface S. If Γ is a graph above the x, y-plane E with a convex projection curve $\underline{\Gamma} \subset E$ and S is a cylindrical surface with a generating curve $\sum_0 \subset E$ satisfying a certain oscillation condition, we prove: Each freely stable, parametric minimal surface in this configuration $\langle \Gamma, S\rangle$ is necessarily a graph above E, and its height function solves a mixed boundary value problem for the minimal surface equation. Consequently, these configurations $\langle \Gamma, S\rangle$ only bound one freely stable, parametric minimal surface.

Reviewer: F.Sauvigny (Cottbus)

MSC:

53A10	Minimal surfaces in differential geometry, surfaces with prescribed mean curvature	Cited in **1** Review
49Q05	Minimal surfaces and optimization	Cited in **3** Documents

Keywords:

uniqueness; disc-type minimal surfaces; freely stable minimal surfaces; boundary configuration

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