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Uniqueness problem for closed non-smooth hypersurfaces with constant anisotropic mean curvature. (English) [Zbl 1468.49048]


Summary: We study a variational problem for piecewise-smooth hypersurfaces in the $(n+1)$-dimensional Euclidean space. An anisotropic energy is the integral of an energy density that depends on the normal at each point over the considered hypersurface, which is a generalization of the area of surfaces. The minimizer of such an energy among all closed hypersurfaces enclosing the same $(n+1)$-dimensional volume is unique and it is (up to rescaling) so-called the Wulff shape. The Wulff shape and equilibrium hypersurfaces of this energy for volume-preserving variations are not smooth in general. In this article we give recent results on the uniqueness and non-uniqueness for closed equilibria. We also give nontrivial self-similar shrinking solutions of anisotropic mean curvature flow. This article is an announcement of forthcoming papers [Y. Jikumaru and the author, “Non-uniqueness of closed embedded non-smooth hypersurfaces with constant anisotropic mean curvature”, Preprint, arXiv:1903.03958; the author, “Uniqueness of stable closed non-smooth hypersurface with constant anisotropic mean curvature”, Preprint, arXiv:1903.03951].

For the entire collection see [Zbl 1462.35005].

MSC:

49Q10 Optimization of shapes other than minimal surfaces
53C42 Differential geometry of immersions (minimal, prescribed curvature, tight, etc.)
53E10 Flows related to mean curvature
53C45 Global surface theory (convex surfaces à la A. D. Aleksandrov)

Keywords:
anisotropic mean curvature; anisotropic mean curvature flow; anisotropic surface energy; crystalline variational problem; Wulff shape

Full Text: DOI

References:


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