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Schnürer, Oliver C.

Surfaces contracting with speed $|A|^2$. (English) Zbl 1101.53002

J. Differ. Geom. 71, No. 3, 347-363 (2005).

The author investigates families of strictly convex surfaces M_t in $\mathbb{R}^3$ which satisfy the flow equation $\frac{d}{dt}X = -|A|^2\nu$, where $X = X(x,t)$ is the embedding vector of a manifold M_t in $\mathbb{R}^3$, ν is the outer unit normal vector to M_t, and $|A|^2$ is the square of the norm of the second fundamental form. The main result is the following (Theorem 1.1):

For any smooth closed strictly convex surface M in $\mathbb{R}^3$, there exists a smooth family of closed strictly convex surfaces M_t, $t \in [0,T)$, solving the above flow equation with $M_0 = M$. For $t \to T$, M_t converges to a point Q. The rescaled surfaces $(M_t - Q) \cdot (6(T-t))^{-1/3}$ converge smoothly to the unit sphere $\mathbb{S}^2$.

Reviewer: Yurii G. Nikonorov (Rubtsovsk)

MSC:

53A05 Surfaces in Euclidean and related spaces

53C45 Global surface theory (convex surfaces à la A. D. Aleksandrov)

53C44 Geometric evolution equations (mean curvature flow, Ricci flow, etc.) (MSC2010)

Cited in **14** Documents

Keywords:

flow equations; convex surfaces; the second fundamental form

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