

**Deckelnick, Klaus**

**Weak solutions of the curve shortening flow.** (English) Zbl 0990.35076  
*Calc. Var. Partial Differ. Equ.* 5, No. 6, 489-510 (1997).

The author formulates a parametric notion of weak solution for the curve shortening flow in arbitrary codimensions, and he proves the existence of such a solution which is global in time for an arbitrary smooth closed initial curve in  $\mathbb{R}^n$ . The idea is to replace the problem by a simpler one which preserves the geometry of the evolving curves, and then to show that the modified problem has a weak solution in the author's sense by proving suitable a priori estimates for the solutions of a family of regularized problems and extracting a convergent subsequence.

Alternative notions of generalized solution for mean curvature flow of arbitrary dimension and codimension have been developed by *K. A. Brakke* [The motion of a surface by its mean curvature, Princeton University Press (1978; [Zbl 0386.53047](#))] and by *L. Ambrosio* and *H. M. Soner* [*J. Differ. Geom.* 43, 693-737 (1996; [Zbl 0868.35046](#))].

Reviewer: [J.Urbas \(Bonn\)](#)

**MSC:**

- [35K65](#) Degenerate parabolic equations
- [35D05](#) Existence of generalized solutions of PDE (MSC2000)
- [58E10](#) Variational problems in applications to the theory of geodesics (problems in one independent variable)
- [49Q99](#) Manifolds and measure-geometric topics

Cited in **12** Documents

**Keywords:**

curve shortening flow in arbitrary codimension; weak solutions; existence; a priori estimates

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