

Almgren, F.; Browder, W.; Lieb, E. H.

Co-area, liquid crystals, and minimal surfaces. (English) Zbl 0645.58015

Partial differential equations, Proc. Symp., Tianjin/China 1986, Lect. Notes Math. 1306, 1-22 (1988).

[For the entire collection see [Zbl 0631.00004](#).]

Authors' abstract: "Oriented n area minimizing surfaces (integral currents) in M^{m+n} can be approximated by level sets (slices) of nearly m -energy minimizing mappings $M^{m+n} \rightarrow S^m$ with essential but controlled discontinuities. This gives new perspective on multiplicity, regularity, and computation questions in least area surface theory."

The main general theorem tells that the n -area of such an area minimizing surface in a given homology class can be obtained as infima of various m -energies. The paper avoids technicalities and is pleasant to read also for non-experts. It explains the basic ideas and sketches the proofs for the general theorems and some more concrete special cases. Also the motivation from the geometry of liquid crystals is discussed.

Reviewer: [P.Mattila](#)

MSC:

58E12 Variational problems concerning minimal surfaces (problems in two independent variables) Cited in **23** Documents

49Q20 Variational problems in a geometric measure-theoretic setting

Keywords:

area minimizing integral current; co-area formula; area minimizing surfaces; m -energy minimizing mappings; liquid crystals