

**Finn, Robert; Lu, Jianan**

**Some remarkable properties of  $H$ -graphs.** (English) Zbl 0898.53007  
Mem. Differ. Equ. Math. Phys. 12, 57-61 (1997).

Let  $H = H(u) : \mathbb{R} \rightarrow \mathbb{R}$  be a given function with  $H'(u) \geq 0$  and  $H(-\infty) \neq H(\infty)$ . The authors consider solutions  $u = u(x, y) : B_R(0) \rightarrow \mathbb{R}$  of the differential equation

$$\operatorname{div}[(u_x, u_y)/\sqrt{1 + u_x^2 + u_y^2}] = 2H(u) \quad (*)$$

and derive an estimate of the gradient of  $u$  at the origin. Notably, the bound on the norm of the gradient at the origin depends only on the radius  $R > 0$  of the disk  $B_R(0)$  and on  $u(0)$ . (\*) means that the surface given by the graph of  $u(x, y)$  has the upward oriented mean curvature  $H(u)$ .

The proofs are based on a comparison of  $u$  with a certain solution of (\*) in a so-called moon domain. As a consequence of this estimate, a form of Harnack's inequality is obtained in which no positivity hypothesis appears.

Reviewer: [Erich Hoy \(Friedberg\)](#)

**MSC:**

- [53A10](#) Minimal surfaces in differential geometry, surfaces with prescribed mean curvature Cited in 1 Document
- [35J60](#) Nonlinear elliptic equations
- [35B45](#) A priori estimates in context of PDEs

**Keywords:**

[H-graph](#); [gradient estimate](#); [Harnack inequality](#)

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