

NON-EXISTENCE THEOREMS FOR SYSTEMS OF QUASILINEAR PARTIAL DIFFERENTIAL EQUATIONS

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1. Introduction. In this paper we shall investigate the non-existence of ground states of quasilinear systems of the form

$$\begin{cases} -\operatorname{div}(A(|Du|)Du) = f(|x|, u, v), \\ -\operatorname{div}(B(|Dv|)Dv) = g(|x|, u, v), \end{cases} \quad (1)$$

in \mathbb{R}^N , $N \geq 3$. Here D denotes the gradient operator, A, B are positive scalar functions and f, g are given nonlinearities that will be specified later.

We recall that a ground state of (1) is a positive radially symmetric solution of (1) such that

$$\lim_{|x| \rightarrow \infty} u(|x|) = \lim_{|x| \rightarrow \infty} v(|x|) = 0. \quad (2)$$

The corresponding scalar problem, i.e.,

$$-\operatorname{div}(A(|Du|)Du) = f(|x|, u) \quad \text{in } \mathbb{R}^N \quad (3)$$

has been studied extensively in a series of pioneering papers by Ni and Serrin ([15], [16] and [17]). In this paper we shall consider some extensions of their results to the system in (1). As a consequence we shall obtain some results which to our knowledge are new even in the scalar case.

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