Avrin, Joel; **Goldstein, Jerome A.**

Global existence for the Benjamin-Bona-Mahony equation in arbitrary dimensions. (English)

Zbl 0591.35012

Nonlinear Anal., Theory Methods Appl. 9, 861-865 (1985).

The Benjamin-Bona-Mahony equation

$$u_t - u_{xxt} + uu_x = 0, \quad x \in \mathbb{R}, \quad t \geq 0,$$

models long waves in a nonlinear dispersive system. Global existence and uniqueness results for this equation were established by *T. B. Benjamin, J. L. Bona* and *J. J. Mahony* [Philos. Trans. R. Soc. Lond., A 272, 47–78 (1972; Zbl 0229.35013)]. In higher dimensions, the generalized BBM equation is

$$u_t - \Delta_x u_t + div(\phi u) = 0, \quad x \in \mathbb{R}^d, \quad t \geq 0.$$

In two papers by *B. Calvert* [Math. Proc. Camb. Philos. Soc. 79, 545–561 (1976; Zbl 0319.47030) and *B. J. Wichnoski* and the second author [Nonlinear Anal., Theory Methods Appl. 4, 665–675 (1980; Zbl 0447.35068)], existence results were obtained in dimension $d \leq 5$ when ϕ' satisfies a polynomial-like growth bound. Here the results of Wichnoski and the second author are extended to all dimensions.

Reviewer: G. Gudmundsdottir

MSC:

35G25 Initial value problems for nonlinear higher-order PDEs
35Q53 KdV equations (Korteweg-de Vries equations)
35A05 General existence and uniqueness theorems (PDE) (MSC2000)

Keywords:

Benjamin-Bona-Mahony equation; nonlinear dispersive system

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