

**GLOBAL SOLUTIONS AND  
THEIR ASYMPTOTIC BEHAVIOR FOR  
BENJAMIN-ONO-BURGERS TYPE EQUATIONS**

A.S. FOKAS AND L. LUO\*

Department of Mathematics, Imperial College, University of London  
London, SW7 2BZ, United Kingdom

(Submitted by: Jerry L. Bona)

**1. Introduction.** This paper studies an initial-value problem for the generalized Benjamin-Ono-Burgers equation (BOB)

$$u_t + P(u)_x - \nu u_{xx} - \mathbb{H}(u_{xx}) = 0, \quad x \in \mathbb{R}, \quad t > 0, \quad (1.1)$$

$$u(x, 0) = f(x), \quad x \in \mathbb{R}, \quad (1.2)$$

where  $P(u) : \mathbb{R} \rightarrow \mathbb{R}$  is a given  $C^\infty$  function satisfying certain growth conditions to be specified below, and  $\mathbb{H}$  is the Hilbert transform defined by the principal-value integral

$$\mathbb{H}u(x) = \frac{1}{\pi} PV \int_{-\infty}^{\infty} \frac{u(y)}{x-y} dy. \quad (1.3)$$

In equation (1.1), subscripts denote partial differentiation,  $u(x, t)$  is a real-valued function, and  $\nu$  is a positive number. Using PDE techniques, the following results are obtained about the solution and its long time asymptotic behavior of the above initial value problem:

1. Let  $P(u)$  satisfy either of the following two restrictions,

$$\limsup_{u \rightarrow +\infty} \frac{|P'(u)|}{|u|^2} \leq C, \quad (1.4)$$

---

Received for publication January 1998.

\*Current address: Department of Mathematical Sciences, New Jersey Institute of Technology, Newark, NJ 07102.

AMS Subject Classifications: 35B40, 35B45, 35C20, 35Q58, 35Q72, 45G10, 76B15.