DESCRIPTIONS OF DECAY FOR HAMILTONIAN *ABCD* BOUSSINESQ SYSTEM

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Abstract

The Boussinesq *abcd* system was originally derived by Bona, Chen and Saut [J. Nonlinear. Sci. (2002)] as first order 2-wave approximations of the incompressible and irrotational, two dimensional water wave equations in the shallow water wave regime. Among many particular regimes, the *Hamiltonian generic* regime is characterized by the setting $b = d > 0$ and $a, c < 0$. It is known that the system in this regime is globally well-posed for small data in the energy space $H^1 \times H^1$ by Bona, Chen and Saut [Nonlinearity (2004)]. In this talk, we are going to discuss about the decay of small solutions to *abcd* system in three directions: First, for a sufficiently *dispersive abcd* systems (characterized only in terms of parameters a, b and c), all small solutions must decay to zero, locally strongly in the energy space, in proper subset of the light cone $|x| \leq |t|$. Second, for every ray $x = vt$, $|v| < 1$ inside the light cone, small solutions to sufficiently dispersive system (smallness and dispersion are characterized by v) decay to zero, in proper subset along the ray. Last, small solutions decay to zero in exterior regions $|x| \gg |t|$ under suitable conditions of parameters (a, b, c). All results rule out, among other things, the existence of zero or nonzero speed or super-luminical small solitary waves in each regime where decay is present.

This is joint work with Claudio Muñoz.