Norm inflation for Benjamin-Bona-Mahony Equation in Fourier amalgam and Wiener amalgam spaces with negative regularity

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Abstract

In this talk, we consider the BBM equation

$$u_t + u_x + uu_x - u_{xxt} = 0, \quad (x,t) \in \mathscr{M} \times \mathbb{R}$$

where $\mathscr{M} = \mathbb{R}$ or $\mathbb{T}$. We establish norm inflation (NI) (a stronger form of ill-posedness) with infinite loss of regularity at general initial data in Fourier amalgam and Wiener amalgam spaces with negative regularity. This strengthen several known NI results at zero initial data in $H^s(\mathbb{T})$ established by Bona-Dai [1] (2017) and ill-posedness result established by Bona-Tzvetkov [2] (2009) and Panthee [5] (2011) in $H^s(\mathbb{R})$. Our result is sharp with respect to the local well-posedness result of Banquet-Villamizar-Roa []3 (2021) in modulation spaces $M^{2,1}(\mathbb{R})$\$ for $s \geq 0$. Proof of these results uses abstract well-posedness results from Bejenaru-Tao [4] (2006).

Recent Publications

1. J. Bona and M. Dai, Norm-inflation results for the BBM equation, J. Math. Anal. Appl., 446 (2017), pp. 879–885
2. J. Bona and N. Tzvetkov, Sharp well-posedness results for the BBM equation, Discrete Contin. Dyn. Syst., 23 (2009), pp. 1241–1252.
3. C. Banquet and E. J. Villamizar-Roa, Time-decay and Strichartz estimates for the BBM equa- tion on modulation spaces: existence of local and global solutions, J. Math. Anal. Appl., 498 (2021), pp. 124934, 23
4. I. Bejenaru and T. Tao, Sharp well-posedness and ill-posedness results for a quadratic non-linear Schr ¨odinger equation, J. Funct. Anal., 233 (2006), pp. 228–259.
5. M. Panthee, On the ill-posedness result for the BBM equation, Discrete Contin. Dyn. Syst., 30 (2011), pp. 253–259.



Biography

Saikatul Haque has a Ph.D. in Mathematics from Tata Institute Of Fundamental Research - Centre for Applicable mathematics (TIFR-CAM), Bengaluru, India. He is currently a post-doctoral fellow at Harish-Chandra Research Institute (HRI), Allahabad, India. He works on dispersive partial differential equations.

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Category: (Oral presentation/ Poster presentation): Oral presentation