ON THE SENSITIVITY OF THE SOLITARY WAVE PROFILE RECOVERY FORMULA TO WAVE SPEED NOISE

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ABSTRACT

We derive a bound on the error in the recovery of the profile of an irrotational solitary water wave from pressure data given noise in the measurement of the wave speed. First, we prove that Constantin’s exact solitary wave reconstruction formula is well-defined in the sense of functions given that the wave speed error is sufficiently small. We then analytically prove that the error in the reconstruction is bounded and obtain a formula for this bound. Finally, we compare the estimate with elementary numerical experiments.