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A generalized nonisospectral Camassa-Holm equation and its multipeakon solutions

The Camassa-Holm (CH) equation is a well-known example of integrable systems and attracted many researches. The most attractive character is that it admits certain weak solution called peaked solutions (peakons). The explicit expressions of its multi-peakon solutions have been obtained by Beals, Sattinger and Szmigielski, who used inverse spectral method and the Stieltjes theorem on continued fractions. Observing that the expressions can be described by means of Hankel determinants, we reconfirmed this by an algebraic approach. By altering the evolution with respect to time t for the moments of Hankel determinant, after a series of inverse calculations, we propose an extension of the Camassa-Holm equation, which also admits the multipeakon solutions. The novel aspect is that our approach is mainly based on classic determinant technique. Furthermore, the proposed equation is shown to possess a nonisospectral Lax pair.

[1] R. Beals, D. H. Sattinger, and J. Szmigielski. Multi-peakons and a theorem of Stieltjes. *Inverse Problems*, 15:L1–L4, 1999.

[2] R. Beals, D. H. Sattinger, and J. Szmigielski. Multipeakons and the classical moment problem. *Adv. Math.*, 154(2):229–257, 2000.

[3] X.K. Chang, X.M. Chen, and X.B. Hu, A generalized nonisospectral Camassa-Holm equation and its multipeakon solutions. *263:154–177*, 2014