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## Global Existence of Solutions for the Kawahara Equation in Sobolev Spaces of Negative Indices

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摘要

关键词 [Kawahara equation](#) [Cauchy problem](#) [global solution](#) [almost conservation law](#)

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## Global Existence of Solutions for the Kawahara Equation in Sobolev Spaces of Negative Indices

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**Abstract** We first prove that the Cauchy problem of the Kawahara equation,

$\partial_t u + u \partial_x u + \beta \partial_x^3 u + \gamma \partial_x^5 u = 0$ , is locally solvable if the initial data belong to  $H^r(\mathbf{R})$  and  $r \geq -\frac{7}{5}$ , thus improving the known local well-posedness result of this equation. Next we use this local result and the method of "almost conservation law" to prove that global solutions exist if the initial data belong to  $H^r(\mathbf{R})$  and  $r > -\frac{1}{2}$ .

**Key words** [Kawahara equation](#) [Cauchy problem](#) [global solution](#) [almost conservation law](#)

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