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一类变式Boussinesq系统的行波解

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Travelling Wave Solutions of a Variant of the Boussinesq System

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摘要 本文研究一类变式Boussinesq系统
$\eta_t+((1+a\eta)w)_x-\beta/6\ w_{xxx}=0,\ w_t+aww_x+\eta_x-\beta/2\ w_{xxt}=0,$
其中 a和 β都是正常数. 许多逼近模型都能从此系统中被推导出, 比如Boussinesq系统和两分量Camassa-Holm系统等. 本文利用平面动力系统方法研究它的行波解及相图， 得到了孤立波解, 广义扭波解, 广义反扭波解, 紧孤立波解和周期波解, 并给出了这些解的数值模拟.

关键词： 孤立波解 广义(反)扭波解 紧孤立波解 周期波解

Abstract： This paper considers a variant of the Boussinesq system
$\eta_t+((1+a\eta)w)_x-\beta/6\ w_{xxx}=0,\ w_t+aww_x+\eta_x-\beta/2\ w_{xxt}=0,$
where a and β are positive constants. A lot of approximate models like the Boussinesq system and the two-component Camassa-Holm system can be derived from this system. We here study its travelling wave solutions and analyze its phase portraits by applying the qualitative analysis methods of planar autonomous systems. We obtain its solitary wave solutions, kink-like or antikink-like wave solutions, compacton-like wave solutions and periodic wave solutions. Some numerical simulations of its solutions are also given.

Key words： solitary wave solutions kink-like or antikink-like wave solutions compacton-like wave solutions periodic wave solutions

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