

Painlevé Properties and Exact Solutions of the Generalized Coupled KdV Equations

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The generalized coupled Korteweg-de Vries (GCKdV) equations as one case of the four-reduction of the Kadomtsev-Petviashvili (KP) hierarchy are studied in details. The Painlevé properties of the model are proved by using the standard Weiss-Tabor-Carnevale (WTC) method, invariant, and perturbative Painlevé approaches. The meaning of the negative index $k = -2$ is shown, which is indistinguishable from the index $k = -1$. Using the standard and nonstandard Painlevé truncation methods and the Jacobi elliptic function expansion approach, some types of new exact solutions are obtained.

Key words: Painlevé Analysis; GCKdV Equations; Exact Solutions.