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The application of homotopy analysis method to solve a generalized Hirota-Satsuma coupled KdV equation. (English) [Zbl 1273.65156](#)

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Summary: Here, an analytic technique, namely the homotopy analysis method (HAM), is applied to solve a generalized Hirota-Satsuma coupled KdV equation. HAM is a strong and easy-to-use analytic tool for nonlinear problems and does not need small parameters in the equations. Comparison of the results with those of Adomian's decomposition method (ADM) and homotopy perturbation method (HPM), has led us to significant consequences. The homotopy analysis method contains the auxiliary parameter Planck constant over two pi, which provides us with a simple way to adjust and control the convergence region of solution series.

MSC:

[65M99](#) Numerical methods for partial differential equations, initial value and time-dependent initial-boundary value problems

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[65N99](#) Numerical methods for partial differential equations, boundary value problems

[35Q53](#) KdV equations (Korteweg-de Vries equations)

Keywords:

[homotopy analysis method](#); [Adomian's decomposition method](#); [homotopy perturbation method](#); [generalized Hirota-Satsuma coupled KdV equation](#)

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