New Applications of the Homotopy Analysis Method

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An analytical technique, namely the homotopy analysis method (HAM), is applied using a computerized symbolic computation to find the approximate and exact solutions of nonlinear evolution equations arising in mathematical physics. The HAM is a strong and easy to use analytic tool for nonlinear problems and does not need small parameters in the equations. The validity and reliability of the method is tested by application on three nonlinear problems, namely the Whitham-Broer-Kaup equations, coupled Korteweg-de Vries equation and coupled Burger's equations. Comparisons are made between the results of the HAM with the exact solutions. The method is straightforward and concise, and it can also be applied to other nonlinear evolution equations in physics.