Bifurcation and Solitary Waves of the Combined KdV and mKdV Equation

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Abstract: Bifurcation, bistability and solitary waves of the combined KdV and mKdV equation are investigated systematically. At first, bifurcation and bistability are analyzed by selecting an integral constant as the bifurcation parameter. Then, different conditions expressed in terms of the bifurcation parameter are obtained for the existence of breather-like, algebraic, pulse-like solitary waves, and shock waves. All types of the solitary wave and shock wave solutions are given by direct integration. Finally, an approximate analytic method by employing the interpolation polynomials is utilized to give simpler forms for the pulse-like solitary wave solutions. In view of the references, our results are the most complete and the theoretical methods are the simplest hitherto.

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