Exact Periodic Wave Solutions to the Melnikov Equation

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Exact periodic wave solutions in terms of the Jacobi elliptic functions are obtained to the Melnikov equation by means of the extended mapping method with symbolic computation. The stability of these periodic waves is numerically studied. The results show that the linearly combined waves of $cn$— and $dn$— functions can propagate stably. For the blow up solutions, the linearly combined periodic solutions of $nd$— and $sd$— functions and of $dc$— and $sc$— functions can also propagate stably and others can not do. Under the limit conditions, some new solitary wave solutions and trigonometric periodic wave solutions are got. The method is applicable to a large variety of nonlinear partial differential equations. – PACS: 05.45.Yv, 02.30.Ik, 02.30.Jr

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