Exact Periodic Wave Solutions to the Melnikov Equation

Yan-ze Peng

Department of Mathematics, Huazhong University of Science and Technology,
Wuhan 430074, P. R. China

Reprint requests to Y.-z. P.; E-mail: yanzepeng@163.com

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

Key words: The Melnikov Equation; Exact Solutions; Extended Mapping Method.