He, Jihuan

Modified Lindstedt-Poincaré methods for some strongly nonlinear oscillations. III: Double series expansion. (English) Zbl 1072.34507

Int. J. Nonlinear Sci. Numer. Simul. 2, No. 4, 317-320 (2001).

Summary: We propose a new perturbation technique for strongly nonlinear oscillations with two parameters, which need not to be small in the present study. In this new method, the solution is expanded into a double series of the two parameters. In order to avoid the secular terms, a constant in the equation is also expressed in a double series expansion. The preliminary study shows that the obtained approximate solutions are uniformly valid on the whole solution domain.

For Part I: Expansion of a constant see Int. J. Non-Linear Mech. 37, No. 2, 309–314 (2002; Zbl 1116.34320); and Part II: A new transformation, ibid. 37, No. 2, 315–320 (2002; Zbl 1116.34321).

Reviewer: Reviewer (Berlin)

MSC:

34C15 Nonlinear oscillations and coupled oscillators for ordinary differential equations
34E05 Asymptotic expansions of solutions to ordinary differential equations
34E10 Perturbations, asymptotics of solutions to ordinary differential equations

Full Text: DOI

References:

[1] He J.H, Int. J. Nonlinear Mech. 37 (2) pp 309– (2001)
[2] He J.H, Int. J. Nonlinear Mechanics 37 (2) pp 315– (2001)
[3] He J.H., International Journal of Nonlinear Sciences and Numerical Simulation 1 (1) pp 51– (2000)
[4] He J.H, Journal of Vibration and Control 7 (5) pp 631– (2001)
[5] He J.H, Int. J. Nonlinear Sei. & Numerical Simulation 2 (3) pp 203– (2001)
[6] He J.H, J. University of Shanghai Science & Technology 20 (4) pp 325– (1998)