

**He, Ji-Huan**

**Hamiltonian approach to nonlinear oscillators.** (English) Zbl 1237.70036  
*Phys. Lett., A* 374, No. 23, 2312-2314 (2010).

Summary: A Hamiltonian approach to nonlinear oscillators is suggested. A conservative oscillator always admits a Hamiltonian invariant,  $H$ , which keeps unchanged during oscillation. This property is used to obtain approximate frequency-amplitude relationship of a nonlinear oscillator with acceptable accuracy. Two illustrating examples are given to elucidate the solution procedure.

**MSC:**

70H05 Hamilton's equations  
70K75 Nonlinear modes  
70K30 Nonlinear resonances for nonlinear problems in mechanics  
49S05 Variational principles of physics (should also be assigned at least one other classification number in Section 49-XX)

Cited in **35** Documents

**Keywords:**

nonlinear oscillator; variational principle; Hamiltonian; amplitude-frequency relationship

**Full Text:** [DOI](#)

**References:**

- [1] He, J.H., *Chaos solitons fractals*, 34, 1430, (2007)
- [2] He, J.H., *Int. J. mod. phys. B*, 22, 3487, (2008)
- [3] Kaya, M.O.; Demirbag, S.A.; Zengin, F.O., *Math. problems eng.*, 2009, 450862, (2009)
- [4] Demirbag, S.A.; Kaya, M.O.; Zengin, F.O., *Int. J. nonlin. sci. num.*, 10, 27, (2009)
- [5] Tao, Z.L., *Phys. scripta*, 78, 015004, (2008)
- [6] Shou, D.H., *Phys. scripta*, 77, 045006, (2008)
- [7] He, J.H., *Mech. res. commun.*, 29, 107, (2002)
- [8] Jamshidi, N.; Ganji, D.D., *Curr. appl. phys.*, 10, 484, (2010)
- [9] Mehdipour, I.; Ganji, D.D.; Mozaffari, M., *Curr. appl. phys.*, 10, 104, (2010)
- [10] Ganji, D.D., *J. zhejiang univ. science A*, 10, 1263, (2009)
- [11] Afrouzi, G.A.; Ganji, D.D.; Talarposhti, R.A., *Int. J. nonlin. sci. num.*, 10, 301, (2009)
- [12] Ganji, S.S.; Ganji, D.D.; Ganji, Z.Z., *Acta appl. math.*, 106, 79, (2009)
- [13] Ganji, S.S.; Ganji, D.D.; Karimpour, S., *Int. J. mod. phys. B*, 23, 461, (2009)
- [14] Zhang, H.L.; Xu, Y.G.; Chang, J.R., *Int. J. nonlin. sci. num.*, 10, 207, (2009)
- [15] Oziz, T.; Yildirim, A., *Comput. math. applicat.*, 54, 1184, (2007)
- [16] He, J.H., *Int. J. nonlin. sci. num.*, 9, 207, (2008)
- [17] Zeng, D.Q.; Lee, Y.Y., *Int. J. nonlin. sci. num.*, 10, 1361, (2009)
- [18] Zeng, D.Q., *Chaos solitons fractals*, 42, 2885, (2009)
- [19] He, J.H., *Int. J. nonlin. sci. num.*, 9, 211, (2008)
- [20] Ganji, S.S.; Ganji, D.D.; Babazadeh, H., *Math. meth. appl. sci.*, 33, 157, (2010)
- [21] Ren, Z.F.; Liu, G.Q.; Kang, Y.X., *Phys. scripta*, 80, 045003, (2009)
- [22] Belendez, A., *Int. J. nonlin. sci. num.*, 10, 13, (2009)
- [23] Ren, Z.F.; He, J.H., *Phys. lett. A*, 373, 3749, (2009)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.