

Approximate Solutions for Conservative Nonlinear Oscillators by He's Homotopy Method

Augusto Beléndez^a, Mariela L. Álvarez^a, David I. Méndez^a, Elena Fernández^b,
María S. Yebra^a, and Tarsicio Beléndez^a

^a Departamento de Física, Ingeniería de Sistemas y Teoría de la Señal, Universidad de Alicante,
Apartado 99, E-03080 Alicante, Spain

^b Departamento de Óptica, Farmacología y Anatomía, Universidad de Alicante, Apartado 99,
E-03080 Alicante, Spain

Reprint requests to A. B.; Fax: +34-96-5909750; E-mail: a.belendez@ua.es

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He's homotopy perturbation method is adapted to calculate higher-order approximate periodic solutions of conservative nonlinear oscillators for which the elastic force term is an odd nonlinear function. The method is modified by truncating the infinite series corresponding to the first-order approximate solution before introducing this solution in the second-order linear differential equation, and so on. With carefully constructed iterations, only a few iterations can provide very accurate analytical approximate solutions. An example is presented to illustrate the usefulness and effectiveness of the proposed technique, and comparison of the results obtained using this method with those obtained using other techniques reveals that the former is very effective and convenient.

Key words: Nonlinear Oscillators; Approximate Solutions; Homotopy Perturbation Method.