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An approximate solution technique depending on an artificial parameter: A special example.

(English) [Zbl 0921.35009](#)

Commun. Nonlinear Sci. Numer. Simul. 3, No. 2, 92-97 (1998).

Summary: A new perturbation method is proposed. In contrast to the traditional perturbation methods, this technique does not require a small parameter in the equation. In this method, according to the homotopy technique, a homotopy with an imbedding parameter is constructed, and the imbedding parameter is considered as a “small parameter”, so the method is called homotopy perturbation method, which can take the full advantage of the traditional perturbation methods and the homotopy technique. To illustrate its effectiveness and its convenience, a few typical nonlinear equations are used. The results reveal their first-order approximations obtained by the proposed method are valid uniformly even for very large parameters, and are more accurate than the perturbation solutions.

MSC:

[35B20](#) Perturbations in context of PDEs
[35G20](#) Nonlinear higher-order PDEs
[47J25](#) Iterative procedures involving nonlinear operators

Cited in **1** Review
Cited in **53** Documents

Keywords:

[duffing equation](#); [homotopy perturbation method](#)

Full Text: [DOI](#)

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