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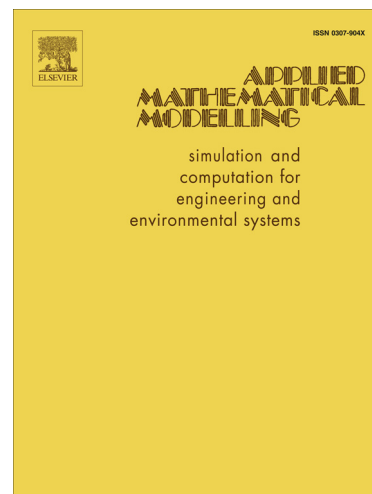
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# Application of the homotopy perturbation method for the large deflection problem of a circular plate

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## Abstract

A moderate improvement of the standard homotopy perturbation method is given and applied to the large deflection problem of a uniformly loaded circular plate with edge simply supported and fastened. Compared with the general homotopy perturbation method, there are two innovations in our method. On the one hand, the homotopy equations are constructed based on part of equations instead of all equations of the system. On the other hand, a parameter in the system is expanded to finite terms which have more freedom to be selected and it can be used to adjust the accuracy of the approximate solutions. More accurate solutions for the large deflection problem are obtained by the proposed method. The error comparisons with classical perturbation solutions show the efficiency and convenience of the proposed homotopy perturbation method.

*Keywords:* Homotopy perturbation method, Nonlinear boundary value problem, Large deflection

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## 1. Introduction

Nonlinear analysis is one of the most challenging topics in elasticity. The large deflection of plates is a typical nonlinear problem, its governing equations are the well-known Von Kármán' equations. Many researchers studied related boundary problem of the equations (see [1]-[3] and references there).

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