

Stability, bifurcations and non-linear eigenvalue problems in physics

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Abstract

A major number of physics problems related to the study of the stability of solutions of differential equations can be interpreted as nonlinear eigenvalue problems. In this study we offer an effective numerical method for solving such problems. This method is based on the continuous analog of Newton's method. The linearized equations occurring at every iteration are solved using a spline-collocation scheme. Concrete examples of applying the method to various physical problems are demonstrated.

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