ON AN OBLIQUE PROJECTION METHOD FOR SOLVING THE EIGENVALUE PROBLEM OF THE COMPANION MATRIX[*]

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Abstract

In the present research, we take another look at the relatively new method for computing eigenvalues and eigenvectors of the Frobenius companion matrix. The purpose of the paper is to interpret the method considered in terms of oblique projection methods, i.e. as a Galerkin type method. Based on this dependence, we derive some new theoretical results. We establish certain error estimates, which will contribute to further studies of the convergence analysis of the method under consideration.

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1 Introduction

We consider the particular eigenvalue problem: find a scalar $\lambda \in \mathbf{C}$ and a nonzero vector $\mathbf{x} \in \mathbf{C}^n$ such that

$$A\mathbf{x} = \lambda\mathbf{x}, \tag{1}$$