عنوان مقاله:

Determination of a Matrix Function in the Form of f(A)=g(q(A)) Where g(x) Is a Transcendental Function and q(x) Is a Polynomial Function of Large Degree Using the Minimal Polynomial

محل انتشار:

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خلاصه مقاله:

Matrix functions are used in many areas of linear algebra and arise in numerical applications in science and engineering. In this paper, we introduce an effective approach for determining matrix function f(A)=g(q(A)) of a square matrix A, where q is a polynomial function from a degree of m and also function g can be a transcendental function. Computing a matrix function f(A) will be time- consuming and difficult if m is large. We propose a new technique which is based on the minimal polynomial and characteristic polynomial of the given matrix A, which causes, to reduce the degree of polynomial function significantly. The new approach has been tested on several problems to show the efficiency of the presented method. Finally, the application of this method in state space and matrix quantum mechanics is highlighted.

کلمات کلیدی:

Matrix function, Matrix polynomial, Minimal polynomial, Characteristic polynomial, Eigenvalue decomposition, Jordan canonical form

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