On new rational-polynomial Hermite matrix expansions. Application for the matrix cosine approximation

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ABSTRACT

The computation of matrix trigonometric functions has received remarkable attention in the last decades due to its usefulness in the solution of systems of second-order linear differential equations. Several state-of-the-art algorithms have been provided for computing these matrix functions, see [1, 2] and references therein.

In the past, Hermite matrix polynomials have allowed efficient approximations for the sine and matrix cosine, see for example references [3, 4, 5].

In this work, we introduce new rational-polynomial Hermite matrix expansions which permit us to obtain accurate and powerful methods for computing the matrix cosine. These proposed methods are compared with the currently most advertised method [6], which is based on the Padé method for computing the matrix cosine.

References

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