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Summary: A general family of iterative methods including a free parameter is derived and proved to be convergent for computing matrix sign function under some restrictions on the parameter. Several special cases including global convergence behavior are dealt with. It is analytically shown that they are asymptotically stable. A variety of numerical experiments for matrices with different sizes is considered to show the effectiveness of the proposed members of the family.

MSC:
65F30 Other matrix algorithms (MSC2010)
15B35 Sign pattern matrices
65F10 Iterative numerical methods for linear systems
65F60 Numerical computation of matrix exponential and similar matrix functions

Keywords:
matrix sign function; stability; iterative methods; Chebyshev-Halley family; eigenvalues; convergence; numerical experiment

Software:
mftoolbox; Mathematica

Full Text: DOI

References:
[13] Iannazzo, B., Numerical solution of certain nonlinear matrix equations, (2007), Dipartimento di Matematica, Università di...

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