

Qiao, Jiyue

Error analysis and determination of the scaling constant for the scaling power method.

(Chinese) [Zbl 0647.65031](#)

Acta Math. Appl. Sin. 10, No. 4, 491-497 (1987).

The scaling power method discussed intensively by *R. C. Ward* [*SIAM J. numer. Anal.* 14, 600-610 (1977; [Zbl 0363.65031](#))] is one of the most efficient methods for computing the matrix exponential e^{At} which is implemented through converting e^{At} into $[e^{At/N}]^N$. In this paper, an appropriate chosen interval for N is given. A skip product method to overcome the difficulty of huge amount of computation and the error analysis of the method are advanced. A numerical example of an ill-conditioned differential equation with the rigidity ratio 10^6 is included.

Reviewer: Wang Chengshu

MSC:

65F30 Other matrix algorithms (MSC2010)

65L05 Numerical methods for initial value problems involving ordinary differential equations

Keywords:

scaling power method; matrix exponential; skip product method; error analysis; numerical example; ill-conditioned differential equation