

数学与系统科学研究院

计算数学所学术报告

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报告题目: Exponential integrators using Krylov iteration

邀请人: Prof. Jialin Hong

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计算数学所报告厅

Abstract:

Partial differential equations are often solved by first discretizing the spatial domain, leading to a large system of

ordinary differential equations, which can then be solved by a numerical integrator. One of the challenges in this approach is that the system of ordinary differential equations is usually stiff. This necessitates the use of implicit integrators or small time steps. Exponential integrators provide an alternative method for overcoming this issue. The idea here is that the stiffness is usually in the linear part of the equation. Exponential integrators split the equation in a stiff, linear part and a nonstiff, nonlinear part. The linear part is solved exactly by computing a matrix exponential, while the nonlinear part can be solved easily by an explicit integrator. The downside of this technique is that we need to compute the exponential of a matrix. If the matrix is not small, as is the case when solving partial differential equations, then an iterative method needs to be used. Methods based on Krylov subspaces are a natural candidate. I will describe the efforts of Will Wright (La Trobe University, Melbourne) and myself to implement such a procedure and comment on our results.

欢迎大家参加！