

1146-65-101

Thi Thao Phuong Hoang* (tzh0059@auburn.edu), **Lili Ju** and **Zhu Wang**. *Localized Exponential Time Differencing Methods for Parallel Numerical Solution of Stiff Differential Equations.*

Exponential integrators, among them the Exponential Time Differencing (ETD) methods, have been widely used for solving stiff evolution equations due to their accuracy, stability and ability of maintaining exponential behavior. The cost of these methods is obviously dominated by the computing of matrix exponentials and their products with vectors. To overcome this challenge, one may use domain decomposition techniques and solve a sequence of smaller-sized subdomain problems, in which the matrix exponentials are computed locally and in parallel. In this talk, we develop different localized ETD methods based on overlapping or nonoverlapping domain decomposition for linear parabolic equations. Both mathematical analysis and numerical performance of these methods will be studied. (Received January 11, 2019)