國立中山大學應用數學系

學術演講

講　者：Prof. Todd James Arbogast

AMS fellow, Department of Mathematics, The University of Texas at Austin, USA

講　題：Aspects of Discontinuous Multiscale Flow Approximations on Transport and a Two-Level Mortar Preconditioner(I), (II)

時　間：2014/08/14（星期四）15：30 ~ 17：30

地　點：理學院四樓理 SC 4011-2 室

茶　會：15:00~15:30 於理 SC 4010 室（系辦公室）

摘要

We provide an overview of multiscale methods for elliptic flow problems. We discuss three similar approaches that involve the four steps of localization of the problem, incorporation of local fine-scale effects, a global coarse problem to tie everything together, and finally fine-scale reconstruction of the solution. The methods we discuss use mixed multiscale finite elements, the variational multiscale method, and the domain decomposition multiscale mortar mixed method. We show that the multiscale mortar method provides the most accurate flow velocity. However, it is not suitable when combined with parabolic or hyperbolic transport, because the mortar velocity os only weakly continuous. We propose an iterative method to remove the discontinuities, which can be viewed as a two-level preconditioner for the full fine-scale system. It involves a nonsymmetric local preconditioner combined with a coarse preconditioner based on two-scale mortars. The method shows good parallel efficiency.

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