ON MULTI-SCALE DIRECTION-SPLITTING METHODS FOR UNSTEADY DIFFUSION EQUATION WITH HIGHLY HETEROGENEOUS COEFFICIENTS

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ABSTRACT

We describe a multi-scale method that utilizes direction-splitting for solving the unsteady diffusion equation with a highly heterogeneous coefficient. The method is based on the idea of deriving a new PDE governing the flux and thereafter solve for the flux directly. The scalar is subsequently recovered at each time step from the known values of the flux. The method has been implemented in both two and three dimensions and we present results for a few problems using a benchmark dataset.