Maximum-Principle-Preserving Third-Order Local Discontinuous Galerkin Method for Convection-Diffusion Equations on Overlapped Meshes

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Local discontinuous Galerkin (LDG) methods are popular for convection-diffusion equations. In LDG methods, we introduce an auxiliary variable p to represent the derivative of the primary variable u, and solve them on the same mesh. It is well known that the maximum-principle-preserving (MPP) LDG method is only available up to second-order accurate. Recently, we introduced a new algorithm, and solve u and p on different meshes, and obtained stability and optimal accuracy. In this talk, we will continue this approach and construct MPP third-order LDG methods for convection-diffusion equations on overlapped meshes. The new algorithm is more flexible and does not increase any computational cost. Numerical evidence will be given to demonstrate the accuracy and good performance of the third-order MPP LDG method.