Higher order multipoint flux mixed finite element methods

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#516, A.S.T.C, Yonsei U.
연세대학교 첨단관 516호

Dr. Jeonghun Lee

The Institute for Computational Engineering
and Sciences (ICES),
The University of Texas at Austin, USA

In classical finite volume methods for the Darcy flow, numerical flux on a face is expressed by numerical pressure values around the face whereas numerical solutions with mixed methods do not have the property.
This local dependency of numerical flux on pressure values reflects numerical constitutive law which can be preferred from physical viewpoint.
A mixed multipoint flux finite element method (MFMFE) is a variational crime of mixed method which has the local dependency but only the low order method was known.
In this work, we propose MFMFE methods for all higher orders in rectangular and hexahedral meshes.
A key of the development is construction of a new family of mixed finite elements fulfilling several desired properties.

Organizer Eun-Jae Park ejpark@yonsei.ac.kr
Contact Haeeun Han csedept@yonsei.ac.kr
cse.yonsei.ac.kr

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연세대학교 계산과학공학과
Dept. of Computational Science & Engineering