“Mixed Finite Element Method with Piecewise Constant Fluxes”

Abstract:
In this presentation, we consider a new mixed finite element method for diffusion equations on general polygonal/polyhedral meshes. Originally the method was invented in 2007. Then it was used in a number of projects supported by ExxonMobil URC. The main idea of the method is based on the approximation of the fluxes by piecewise constant vector functions (PWCF). The normal components of the approximate vector functions are continuous on the interfaces between polyhedral mesh sells. In the interior of mesh cells these vector functions are discontinuous. The error estimates for the special type of meshes are derived. We discuss applications of the PWCF-method in geosciences as well as numerical results.