Contribution ID: **741** Type: **Oral 20 Minutes**

Novel finite-volume methods for anisotropic linear elasticity and poromechanics problems with full tensors

Tuesday, 15 May 2018 09:32 (15 minutes)

We propose a novel finite volume method for anisotropic linear elasticity problem. The derivation of the flux approximation method for elasticity problem closely follows our previous work [1] on the nonlinear finite volume methods for diffusion equation featuring positivity and discrete maximum principles. It is based on the extensions of the harmonic point idea of [2] from the scalar to vector equations. We further extend the idea to coupled anisotropic flow and mechanics, featuring full tensors for permeability, Biot coefficient and stiffness tensor. Both methods handle star-shaped polyhedral grids, admit the construction of nonlinear finite volume methods and yield several new research directions.

[1] “Cell-centered nonlinear finite-volume methods for the heterogeneous anisotropic diffusion problem”, KM Terekhov, BT Mallison, HA Tchelepi // Journal of Computational Physics 330, 245-267
[2] “A nine-point finite volume scheme for the simulation of diffusion in heterogeneous media.”, L Agelas, Rt Eymard, and R Herbin // Comptes Rendus Mathematique, 347. 11-12 (2009): 673-676.

References

Acceptance of Terms and Conditions

Click here to agree

Primary authors: Dr TEREKHOV, Kirill (INM RAS); Dr CASTELLETTO, Nicola (Stanford University); Prof. TCHELEPI, Hamdi (Stanford University)

Presenter: Prof. TCHELEPI, Hamdi (Stanford University)

Session Classification: Parallel 3-G

Track Classification: MS 2.10: Advanced finite-volume methods for flow and transport in porous media