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## Poroelastoplastic modeling of borehole shear bands on high order curvilinear meshes using CUDA technology

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The presentation describes an approach to solving problems of modeling the development of zones of localization of plastic deformations within the framework of a poroelastoplastic model generalizing Biot's model. A distinctive feature of this model is a two-way coupling between mechanical processes occurring in a porous elastoplastic matrix and a saturating viscous fluid.

For the numerical solution of the problem, a variational formulation based on the Galerkin method and the isoparametric spectral element method (SEM) is used to discretize the geometric model and PDEs on curvilinear unstructured SEM meshes. SEM orders up to the 15th were used for calculations.

The software implementation of the developed algorithm based on SEM is performed using CUDA. A spectral element mesh is naturally mapped to a CUDA grid of SMs, and accordingly, each spectral element is mapped to a streaming block, within which individual nodes are processed by the corresponding threads within the block.

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