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Flow in deformable fractures - From numerical studies to experimental investigations

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Analysis of consistent experimental sets of hydro-mechanical data recorded during hydraulic experiments on single fractures or fractured reservoirs require a consistent numerical model to determine fracture properties with a high accuracy. Hence, this work briefly discusses the derivation and numerical implementation of a consistent, fully coupled hydro-mechanical model for flow in deformable fractures. The computational efficiency of the model is demonstrated in a complex fracture network setting in three dimensions before specific hydro-mechanical phenomena are discussed. One prominent phenomenon is the occurrence of overtones in the frequency domain recorded during harmonic excitation tests and their dependence on the specific normal stiffness characteristic of a single fracture. The relevance of the numerical findings for experimental investigations is demonstrated on different scales consulting results obtained from laboratory and in-situ field tests. Laboratory studies have been performed on single fractures embedded in a cylindrical sample using a recently designed triaxial set-up and transient in-situ measurement data was recorded during harmonic excitation tests at Reiche Zeche underground research laboratory.

Time Block Preference

Time Block A (09:00-12:00 CET)

References

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Primary authors: SCHMIDT, Patrick (University of Stuttgart); LEE, Dongwon (University of Stuttgart); RUF, Matthias (University of Stuttgart - Institute of Applied Mechanics (CE)); Prof. STEEB, Holger (Universität Stuttgart); Prof. RENNER, Jörg (Ruhr-Universität Bochum)

Presenter: SCHMIDT, Patrick (University of Stuttgart)

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