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From CT-scans to numerical simulations of multiphase flow in chalk formations

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# Discrete fracture and matrix (DFM) modeling of chalk

## From CT-scans to numerical simulations of multiphase flow in chalk formations

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The modelling of multiphase flow and geomechanics in fractured rocks due to oil and gas exploitation is of major importance in the understanding of the subsurface processes and the environmental impact of such activities. In addition, this knowledge is highly essential to predict unwanted effects from future carbon capture and storage (CCS) practices and geothermal applications. The mathematical description of the problem and its solution is challenging since the domain is generally anisotropic, heterogeneous, and has substantially discontinuous material properties that can span several magnitude orders. This work explores the mathematical modelling of fractured chalk samples imaged with CT-scanners by employing state-of-the-art skeletonization techniques and machine learning algorithms. The goal is to provide high-fidelity computational models from the CT-scans of fractured chalk samples for multiphase flow and geomechanics simulations, while balancing accuracy and computational cost.