

# Comparison of simulation codes of fracture flow on a benchmark problem with high coefficient variability

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We solve the problem of groundwater flow in stochastically generated network of discrete fractures. We compare the commercial code NAPSAC using standard linear finite elements and own code FLOW123D using mixed-hybrid finite element method. The benchmark problem consist of system of 1D fractures in 2D plane with conductivities varying over several orders of magnitude. Together with presence of very small segments between fracture intersections it leads to numerically unstable problem. The main result of the comparison of codes and methods is the relative error of mass balance which is about  $10^{-1}$  for NAPSAC and  $10^{-5}$  for FLOW123D which confirms the expected property of the mixed-hybrid method.