Practical exercises:

Exercise

Your task is the design of a groundwater production field consisting of three wells aligned within an area of 800 times 1400 meters of a sandy, rather homogeneous unconfined aquifer. The original hydraulic gradient is negligible but take care that the three wells do not influence each other or the area outside of the described domain. The aquifer thickness is 65 meters, with a depth to groundwater of approximately 12 meters. The annual groundwater recharge in the region is typically around 200 mm. Further, the area is influenced by an approximately 40 meter wide fracture zone crossing through the area in NW-SE direction by approximately 40 degree to the north. Under the given circumstances, provide a proposal for the location and the production rate of each of the three wells. Sketch a conceptual model of the situation as a starting point. Further information about the expected aquifer is given below.

Sand: porosity = 25%; hydraulic conductivity = 10^{-5} m/s

Fracture zone: porosity = 2 %; hydraulic conductivity = 10^{-2} m/s in NS and 10^{-3} m/s in EW direction

Theoretical exercises:

Exercise

Compare the benefits and drawbacks of Mudflow and FeFlow with respect to their spatial discretization techniques.

Exercise

Compare FeFlow, Hydrus and Tough with respect to their core capabilities.

Exercise

Argue pro and con for using general FE solvers, such as Comsol Multiphysics, for groundwater flow simulations.