PGE 392K In Class Problem

Nov 24, 2020

1. When you have completed the assignment from Nov 19 and verified the solution, copy all of your files from Nov 19 into a new folder for Nov 24
2. Change your input file to include values included in the powerpoint example “2D example with Pc and G”. Some of the parameters are the same as 2D example on Nov 19 but some are different. In particular, read in the files for permeability, porosity, and depth. Change the grid block sizes which are variable. Call your input file from the command window and make sure that all the inputs are correct.
3. Create a function file that calculates the water and oil formation volume factors, gas density at standard conditions, and oil density of all grid blocks given the oil and water pressure field.



1. Initialize the oil pressure (P), water pressure (Pw), capillary pressure (Pc), and water saturation (Sw) of all 9 blocks. **Verify the answer by comparison to the answers on slide 12 of the powerpoint example**. As a first pass you might skip the iterations but then iterate on oil and water pressures since density depends on pressure.



1. Adapt your capillary pressure curve function file to also compute the derivative of capillary pressure with saturation.
2. Update your calculation of d12 to include derivative of capillary pressure



1. Make sure that interblock relative permeability and fluid properties use potential (and not pressure) for upwinding
2. Run your code
   1. Verify all your arrays and make sure that they are close to my answers. They might be slightly off but should be really close. One potential place of error is upwinding since potentials should be almost identical everywhere. If the wrong block is upwinded it will mess up Tw and To
   2. Check P and Sw after the first time step