PGE 392K In Class Problem

October 15, 2020

Copy your 2D, heterogeneous code from October 13 in a new folder. Then, adapt the code to include vertical wells. Specifically,

1. Your input file should allow the user to put in multiple wells with their locations (x, y position), type (constant rate or constant BHP), well radius, well sin factor, and constraint (value of rate or BHP in scf/day or psi, respectively). I recommend individual vectors for each of these properties with length = #wells, e.g.
   1. Well.x = [ ]
   2. Well.y = [ ]
   3. Well.type = [ ]
   4. Well.constraint = [ ]
   5. Well.rw = [ ]
   6. Well.skin = [ ]
2. You will need an automated way to determine the grid block each well is in based on its x- and y- location. This may require some thoughtful programming especially if the x- and y- grids are non-uniform. You should have a new vector that lists the grid blocks for the wells, e.g.
   1. Well.grid = [ ]

Hint: This requires some logic especially for nonuniform grids. As a first pass, you can just input the grid block number but you will later to make this automated based on the locations (x,y) of the grids.

1. Create a function file that calculates the productivity index, J, for a well when sent the well as well as well, reservoir, fluid, and numerical properties
2. Update your Q vector to include wells. Also, create a new matrix, J, that includes the productivity index of wells (only if they have a constant BHP well in that grid)
3. Test your code against the 3x3 powerpoint example with wells posted on canvas