PGE 392K In Class Problem

October 20, 2020

Copy your 2D, heterogeneous code from October 15 in a new folder. Then, adapt the code to now have all the following features:

* 2D
* Heterogeneous permeability, porosity, grid sizes (x- and y-)
* Anisotropy (in permeability and grid size)
* Wells that allow user to state in an input file the location, type (rate or BHP), constraint value, radius, vertical or horizontal etc.
* Flexible boundary conditions (Neumann or Dirichlet)
* Varying block depth and effect of Gravity

Test your code against the example problem

* L= 1200 ft, W = 600 ft, h= 200 ft
* Kx = [1800 2000 1600 2000 2500 1200 1000 2000 2200] mD
* Ky = 2\*kx; kz= 0.1\*kx;
* Porosity = [0.26 0.20 0.23 .22 .24 .18 .25 .20 .22]
* Ct = 5.0E-6 psi-1
* Visc = 1 cp; FVF = 1.0 RB/STB
* Density = 62.4 lbm/ft3
* x = [200 600 400];
* y = [100 300 200];
* t = 0.01 days
* Implicit method
* BCs = Dirichlet (P – 1200 on right; No flow on other 3 boundaries)
* Wells (all rw=0.5 ft; skin = -0.75)
  + Constant rate producer (10000 scf/day) at x = 600 ft; y = 300 ft)
  + Constant BHP (1500 psi) at x = 1000 ft; y = 500 ft
* depth = [1883.2 2275.6 2300.6 1883.2 2275.6 2300.6 1883.2 2275.6 2300.6]
* Pinit = 1000 psi at 2309.5 ft

Make the following plots and calculations:

1. Pressure at 0.01 days and at steady state
2. Filled contour plot of pressure at various times
3. Plot of well pressure versus time for the constant rate well
4. Plot of well rate versus time for the constant BHP well

Solution

 

