PET-342E Reservoir Engineering-I
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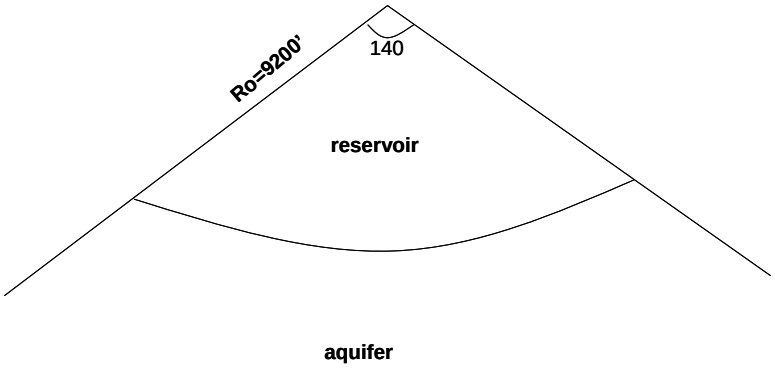
Homework#3
2007-2008
İTÜ

Given: 09 May 2008
Due : 30 May 2008

Problem : A wedge shaped reservoir is suspected of having strong water drive. The schematics of the system is given in the figure below. Properties and production data are provided. Your task is to determine the aquifer size and the initial oil in place.

Fluid and petrophysical properties are provided below:



angle	140
h, ft	100
k, md	200
Viscosity, cp	0.55
porosity	0.25
cw, 1/psi	3×10^{-6}
cf, 1/psi	4×10^{-6}
Bw, rb/STB	1.0
P_{bp}, psi	2740
Swc	0.05

The following production data is provided:

Time	Pressure at OWC	Np	Rp	Bo	Rs	Bg
(years)	psi	(MM/stb)	(scf/stb)	(rb/stb)	(scf/stb)	(rb/scf)
0	2740	0	650	1.404	650	0.00093
1	2500	7.88	760	1.374	592	0.00098
2	2290	18.42	845	1.349	545	0.00107
3	2109	29.15	920	1.329	507	0.00117
4	1949	40.69	975	1.316	471	0.00128
5	1818	50.14	1025	1.303	442	0.00139
6	1702	58.42	1065	1.294	418	0.0015
7	1608	65.39	1095	1.287	398	0.0016
8	1535	70.74	1120	1.28	383	0.0017
9	1480	74.54	1145	1.276	371	0.00176
10	1440	77.43	1160	1.273	364	0.00182

The productivity index can be determined by using the following relationship:

$$j = \frac{fkh}{141.2\mu\left(\ln\left(\frac{r_e}{r_o}\right) - \frac{3}{4}\right)}$$

When performing your computations you should take the time in days. When constructing your straight line plots you can neglect the formation and water compressibilities since this is a water drive reservoir.

Note : I strongly suggest that you use an excel sheet to do this homework. The methodology is as follows:

First determine what kind of havlena and odeh plot you will use. This time you can not ignore W_e. Hence you will use the Fetkovich model given in class. When you make the havlena and odeh plot, if you have used the correct aquifer radius, the plot will give a straight line from which you can determine the initial oil in place.

Once you have constructed the graph in excel, the rest is easy, you would just need to change the aquifer radius and see if the plot yields a straight line.

Hint : You will need to construct a F/Eo vs. We/Eo plot.