

Introduction to reservoir simulation using the ECLIPSE 100 model

This exercise is an introduction to the commercial reservoir simulator ECLIPSE 100. The purpose is to learn how the input and output files of the simulator are built up, and how the results can be plotted using the graphical package of ECLIPSE, GRAF.

The input file for ECLIPSE to be used in this exercise is named ODEH.DATA and can be copied from the home page. This is the data for a three-dimensional gas/oil system, as described in Odeh, A.S: "Comparison of Solutions to a Three-Dimensional Black Oil Reservoir Simulation Problem", *JPT* (Jan 1981) (see .pdf-file on home page).

Make a new folder and copy the file ODEH.DATA into it under the name ODEH.DATA.

Assignment

1. Read the article by Odeh so that you understand the physics of the reservoir and the grid system used.
2. Go through the input file section so that you have an idea of the data structure. ECLIPSE 100 User's Manuals are installed on <http://www.ipt.ntnu.no/manuals>.
3. Run the ECLIPSE model using the data set
 - Start the model (from the new folder) by typing @eclipse and follow instructions
 - When asked for data file name, type ODEH
 - In the original input file, the switch NOSIM is included. This means that the input data will be checked and compiled, but no time steps will be conducted. After making this data checking run, remove NOSIM (--NOSIM), and run again.
 - While the model is running, status reports will be written to the screen. The same information is also written to the file ODEH.PRT which is created in your folder
 - When the run is finished, your folder will contain the following files
ODEH.DBG
ODEH.RSM
ODEH.EGRID
ODEH.PRT
ODEH.INIT
ODEH.SMSPEC
ODEH.UNRST
ODEH.UNSMRY
ODEH.RSSPEC
ODEH.INSPEC
4. For plotting, use Graf, Office, GLview or Excel. The following plots should be made:
 - production rate vs. Time
 - GOR vs. Time
 - WBHP vs. Time (specify well: PRODUCER)
 - WBHP vs. Time (specify well: INJECTOR)
5. Try to experiment with the input data file of ECLIPSE and with GRAF in order become familiar with the models. For instance, you might try to make saturation plots of a cross-section (choose grid plot instead of line plot)
6. The keyword DRSDT in the input data file specifies "no-resolution" of gas in the oil (when it is set to 0.). Make a new run with this switch defaulted (--DRSDT), and compare the plots. **MAKE THE PLOTS OF 4) AND 6) ON THE SAME FIGURE. MAKE COMMENTS TO THE DIFFERENCES THAT YOU OBSERVE.**