

به نام خدای مهربان



Shiraz University

Petroleum Engineering Department

Reservoir Modeling and Simulation Course, Project #1

*Single Phase, Unsteady state, 1D Flow. **Deadline Khordad 15***

- Pay attention to **Deadline date**. Out of date reports will **not be accepted**.
- Use Attached Template in writing your reports.

Send Your Project Files Via SESS

Project File (\*.rar): Matlab File (\*.m) + Report File (\*.PDF + \*.DOC)

Name \*.rar files: **Project1\_YourName.rar**

### Part A

1. Use an **Explicit method with the given data** and prepare a MATLAB code to:
  - a) Find the maximum time step for which the run is stable
  - b) Determine pressure distribution (After 90, 180, 270 and 360 days)
  - c) Find flow rate between:
    - Grids Number 1 and 2
  - d) Well bottom-hole pressure of all wells vs. time.
  - e) Well flow rate vs. time.
  - f) Repeat d with different skin factors.

### Part B

2. Repeat Part A (Except part a, take time step as 1 day), assuming **IMPLICIT method** with explicit treatment of transmissibility linearization method.



### Part C

- Repeat Part A (Except part a, take time step as 1 day), assuming **IMPLICIT method** with iteration linearization method.

### Part D

- Repeat Part A (Except part a, take time step as 1 day), assuming **IMPLICIT method** with fully implicit linearization method.

- Please use below Fluid and Rock Data:

Permeability=100 md

Porosity= 0.2

Viscosity= 5 cp

Oil formation volume factor = 1.2 bbl/stb

Initial pressure = 5000 psi

Compressibility=  $1e-6$  1/psia

Grid Dimensions=  $1000 \times 1000 \times 50$  ft<sup>3</sup> (dx = 1000, dy = 1000 ft)

Well Hosting Blocks (2, 4 and 8)

Production Rates (in blocks 2 and 8) = 100 stb/day

Well in block 4 is producing with 2200 psi constant BHP

Time-step Length (suggested) = 1 days

Total simulation time: 360 days

Left side boundary condition = no flow type

Right side boundary condition = Constant Pressure Boundary 5000 psi

Well radius =0.5 ft.

Skin factor (in blocks 2, 8 and 14) = 2.0

1	2	3	4	5	6	7	8	9	10
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**Good Luck**

**M. Ghaedi**

## **Note for Report**

**Important considerations during writing your reports:**

**1- Fonts:**

**English:** Times New Romans

**Persian:** B Nazanin

**2- Font Size:**

12 to 14 pt.

**3- Font Color:**

Black

**4- Justified text**

**5- Includes Cover Page , Table of Contents**

**6- Figures must be numbered. Figure captions must be below of the figure.**

**7- Tables must be numbered. Table captions must be below of the table.**