**Task 1.: Two-phase flow calculation, homogenous mixture**

The following data is given for an oil-well:

- Oil production: 1194 Sm3/d

- Gas content in reservoir oil: 110 Sm3/ Sm3

- Lift gas injection 2.5.105 Sm3/d

- Specific gas gravity: 0.7

- Specific oil gravity: 0.84

- tubing length 2010 m

- inclination 22o

At downhole conditions:

- solubility gas: 210 Sm3/ Sm3

- formation volume factor, oil: 1.54 m3/ Sm3

- formation volume factor, gas: 4.52.10-3 m3/ Sm3

- temperature 90 C

- pressure 307 bar

- viscosity, oil: 0.5 cP

- viscosity, gas: 0.0012 cP

- inner diameter, production tubing 10 cm

- interfacial tension: 10-3 N/m

- gas z-factor 0.95

Estimate at downhole conditions:

1. Superficial velocity for liquid and gas.
2. Flux fraction
3. Flowregime.
4. Pressure gradient at downhole conditions
5. Tubing head pressure, by linear extrapolation