

ASSIGNMENT 3

CHE 5480

DUE: February 22. Send through e-mail. Include the simulation file and a narrative explaining what was done and how.

Exercise 1: Group work. Present a unified submission of homework 2.

DUE: March 2. Send through e-mail. Include the simulation file and a narrative explaining what was done and how.

Exercise 2:

Consider the pipeline capacity expansion problem of Assignment 2 (not including loops).

- a) Use different gas selling prices through time for different sets of consumers.
- b) Assume you have a contract with a gas supplier, so the purchased gas is fixed. You also give a certain percentage of net revenues to the gas supplier.
- c) Assume demand uncertainty (5% for all clients).
- d) Make the piping diameter and the expansion capacities of compressors your first stage variables.
- e) Obtain optimal solution and also a set of recommended less risky decisions.
- f) Discuss (but not attempt) how would you handle the problem if the capacity of the compressors is a decision that you take later at whatever time. This is called a multistage stochastic problem.

Use the unified GAMS version as a starting point.

Exercise 3:

The gas industry measures all gas (and performs balances) using standard volumes. Prove that this is equivalent to using mass.

Exercise 4: Determine what are the assumptions used to obtain the different pipeline compressible flow equations.

Quang: Fritzsche, Fully Turbulent and Colebrook White,

Debora: Panhandle A, Panhandle B and IGT Distribution

Aravinda: Mueller, Pole and Weymouth,

Andy: Spitzglass Low pressure and Spitzglass High pressure