Assignment 5
Due 10/9/2025

Application Problem 1

Using the provided Homework 5.i input deck (found on learning suite under content→Materials), evaluate the trips in the input deck. Make a list of trip numbers and when each of them will turn on/off. Search through the input deck and find the effect that each of these trips cause. Do this for each of the trips listed in the input deck.

For Example:

Trip 599 turns on when problem time reaches 100 seconds. This causes valve 301 to open which then adds additional cooling water to the system.

Application Problem 2

Part 1

Using the curve below, calculate the Kozloduy homologous head and torque curves. This can be done in your software of choice or by hand, but you need to show your calculations and how you arrived at your answers (turning in an excel sheet or python file is a good way to show this). For this problem:

- Assume the rated condition is at a flow of 20,000 m^3/hr and 9 kgf/cm^2 and that the rated pump speed (and pump speed) are 104.2 rad/s, and the rated efficiency is 80%.
- Generate homologous points at flow rates of 8000, 10000, 15000, 20000, 25000, and 28000 m^3/hr.
- Assume that the density and rated density are 950 kg/m^3

Turn in your calculation sheet for this problem then move on to part 2

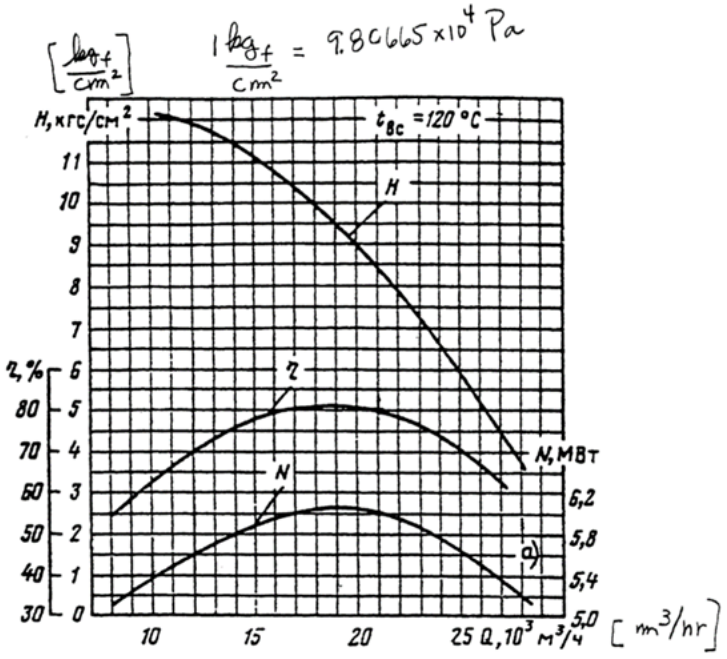

Figure 1. Kozloduy head and efficiency curves

Part 2

The simple model, pump.i has been provided and illustrates a simple transient by adjusting the differential pressure between the time-dependent volumes. The homologous pump curves are based on the Semiscale pump.

- Input all appropriate rated conditions (assume I = 7500 kg-m^2).
- Delete the single-phase Semiscale homologous curves for regimes 1 and 2 in pump.i and replace them with the homologous curves for the Kozloduy pump calculated in Part 1.
    - Note: When deleting Semiscale data, make sure to leave the info where the independent variable is 0.0 as this is required to maintain continuity.
- Run pump.i
- Plot the pump head and analyze the pump response (explain the behavior of the pump head)

Turn In:
Answers to application problem 1
Calculation sheet showing homologous pump curve calculations
Edited pump.i
Plot of the pump head in the pump