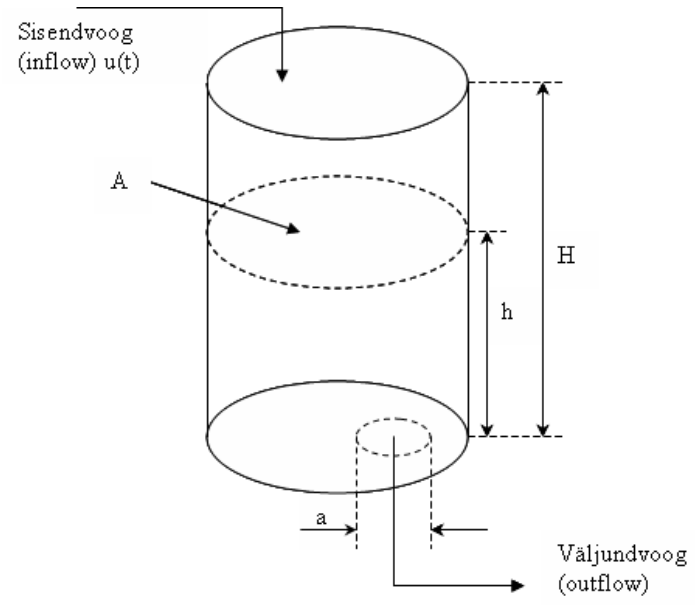
Homework 2

A nonlinear model of the “water tank system” is given (see figure 1).



figuure 1. water tank system

Physical parameters of the cylindrical tank:
Height H=1 *m*;
Diameter of the basis 0,5 m (square A=0.2 m^2)
Diameter of the hole in the bottom 0,04m (square S=0,00126m^2)

The system can be modeled by the following first order differential equation:

$$\frac{dy}{dt} = 0.05u(t) - 0.56\sqrt{y(t)}$$

where output $y(t)$ is normalized level of liquid in the tank:
1 corresponds to H
0 corresponds to an empty tank.

Tasks:

- Choose suitable structure and identify a Neural Network based model
- Compare different structures of the model
- Validate the model
- Estimate accuracy of the model on a validation data set

Submit a report describing all steps and validation of the results to eduard.petlenkov@taltech.ee.