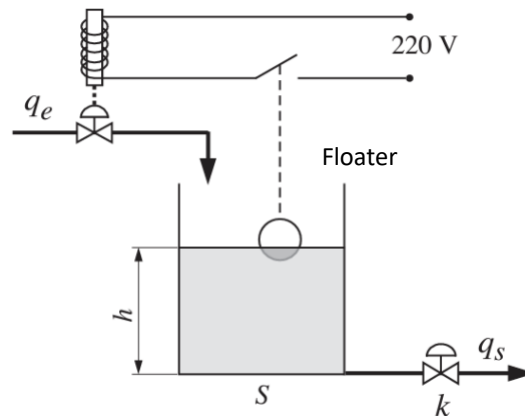


Series 8

Exercise 1

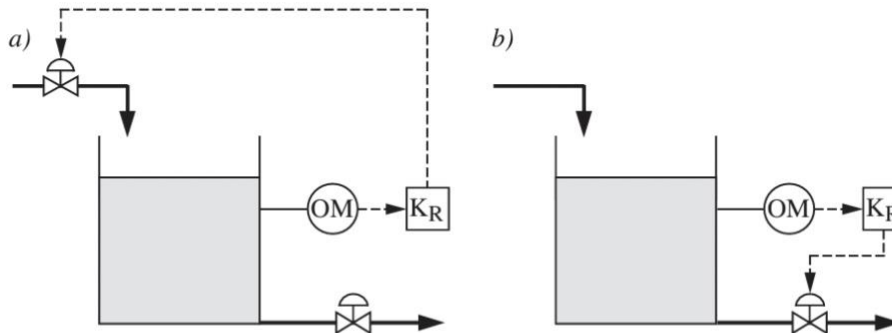
The level of a tank is controlled by an on/off control with hysteresis as shown in the following figure:



- Knowing that the leakage rate q_s is linearly proportional to the level h , *qualitatively* draw the behavior of the controlled variable following a setpoint jump.
- What is the influence of the width of the hysteresis on the amplitude and the frequency of the oscillations of the controlled quantity?

Exercise 2

A level control system can be configured in the following 2 ways:



OM: organe de mesure

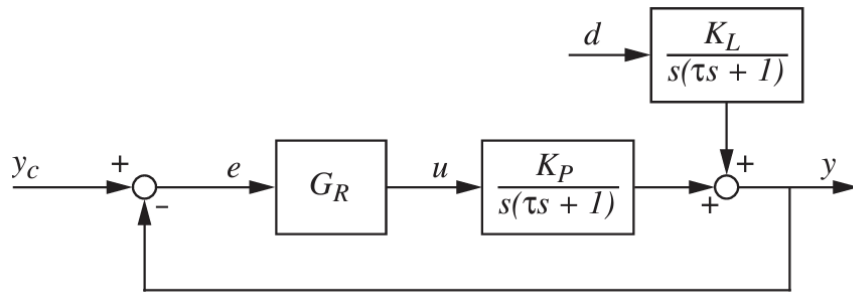
K_R : régulateur proportionnel

Vanne de type «air-to-open»

Which regulator mode of action (inverse, direct) should be chosen in each case?
(Identify the sign of K_R)

Exercise 3

Consider the following command system:



Evaluate the transfer functions $E(s)/Y_c(s)$ and $E(s)/D(s)$ for the cases of a P and PI regulator.