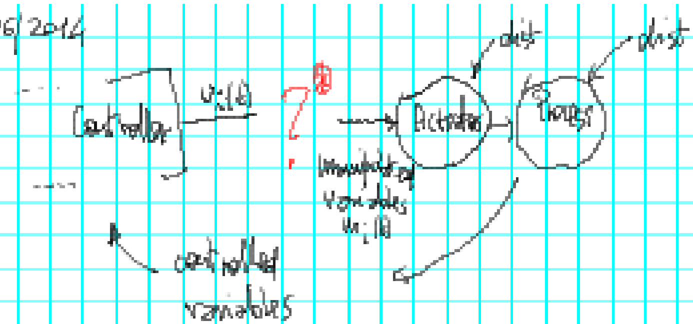
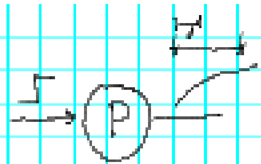
16/06/2014

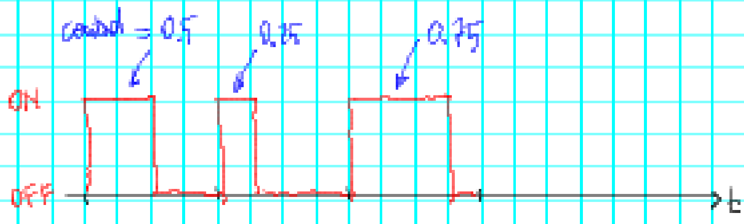
1



(*) Actuation scheme

Note: unreviewed material

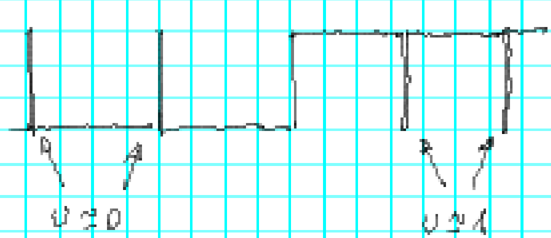




T_s
e.g. 0.1

Possible problems:
ON/OF switching
too close in time

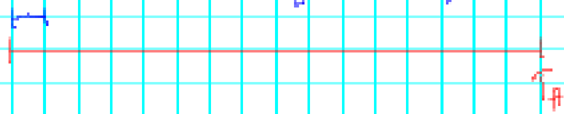
Eg:



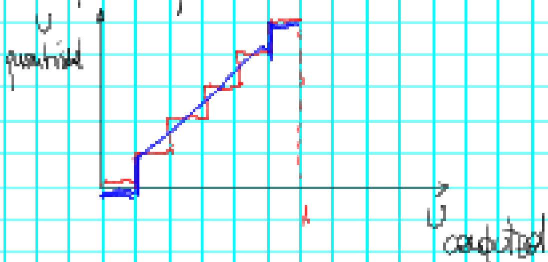
Solution : quantise the control signal

T_{min} between switchings

quantum = $\frac{T_{min}}{T_H}$

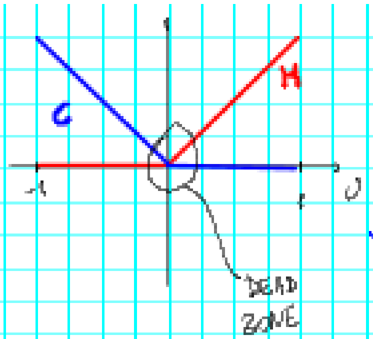


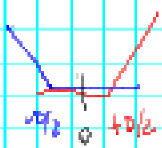
Possibility 1: quantise in the whole range

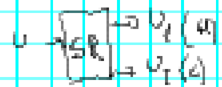


Possibility 2: quantise just at the extreme (≃ u sat)

① can cause limit cycles (permanent oscillations) more likely than 2

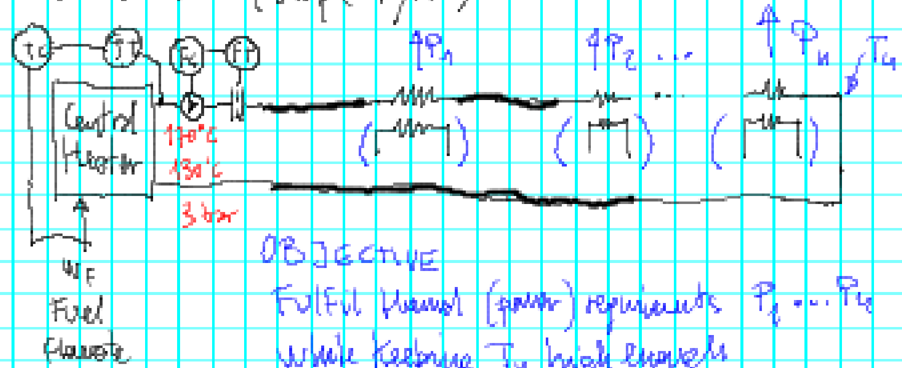

C
H
DEAD
ZONE


0


SR

CASE STUDY 2

Heat network (simple layout)

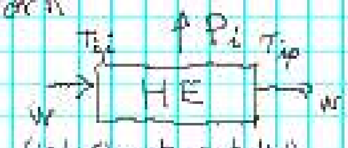


OBJECTIVE

Fulfil thermal (power) requirements $P_1 \dots P_n$

while keeping T_n high enough

- Remark



(loop flow rate, controlled)

$$P_i = wc\,(T_{i,i} - T_{i,o})$$

to fulfil P_i I care about the T drop

Remember, we take the load P_i as an exogenous input (thermal request by user)

Piping

typically the reason

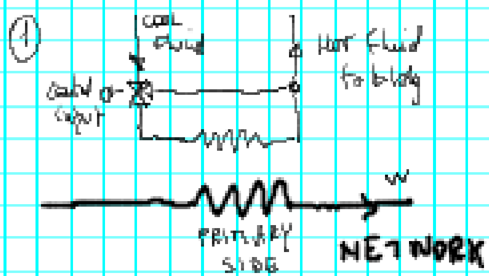
$$P_{loss} = f(T_{i,o}, T_{tm,i}, w, T_{ext})$$

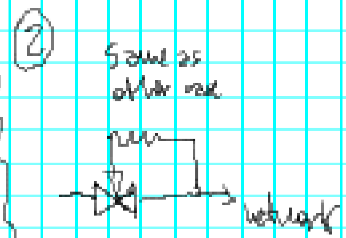
e.g.

$$P_{loss} = G_{loss}\left(\frac{T_{i,o} + T_{tm,i}}{2} - T_{ext}\right)$$

Need to keep piping at as low T as possible

- How users typically operate HES





For us, each load takes prescribed POWER

9