

MAY 19th 2020

PV = ECG FREQUENCY

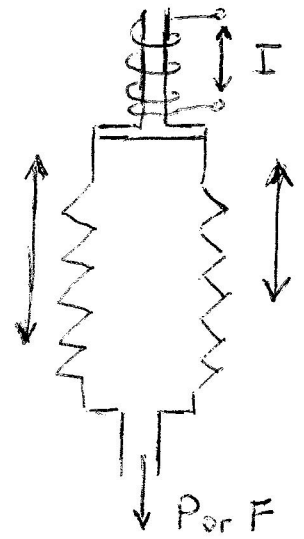
$V_H = F$, FLOWRATE

$V_C = I$

ACTUATOR = PUMP + FORCE
ELECTROMAGNETIC
ACTUATOR

WHAT IS THE MOST CONVENIENT
OUTPUT TO BE CONSIDERED?
PRESSURE OR FLUX?

THE FLUX (FLOWRATE) SINCE WE
WANT TO CONTROL THE ECG FREQUENCY
THAT IS RELATED TO THE FREQUENCY OF THE PUMP

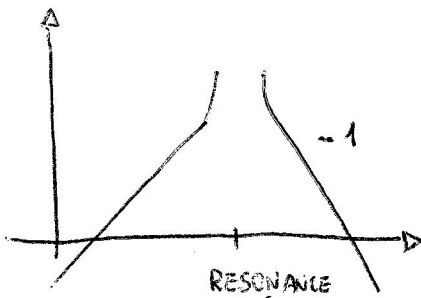


ACTUATOR $F = kI$; PUMP $F = \text{PART TO MOVE THE AIR} + \text{ELASTIC OPPOSITION} = k\dot{x} + k'x$

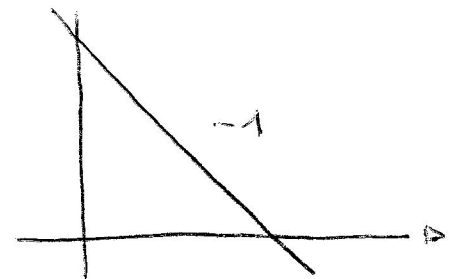
FLOWRATE $A \cdot \text{VELOCITY} = A\dot{x}$;

ECG RATE (pulse/sec) $\approx k \text{ FLOWRATE}$

$$G_T = \frac{PV}{V_C} = \frac{PV}{V_H} \cdot \frac{V_H}{V_C} = \frac{\text{ECGRATE}}{\text{FLOWRATE}} \cdot \frac{\text{FLOWRATE}}{x} \cdot \frac{x}{\text{FORCE}} \cdot \frac{\text{FORCE}}{I} = k_1 SA \cdot \frac{1}{s^2k + k'}$$



THE SYSTEM IS
UNSTABLE
WE CAN ACCEPT
TO WORK
ONLY IN A REDUCED
SET OF FREQUENCIES
BUT IF WE NEGLECT
THE ELASTICITY IN
THE PUMP ...



... STABLE EVENTUALLY
WE CAN COMPENSATE
TO EXTEND THE BANDWIDTH

DELAYS? YES

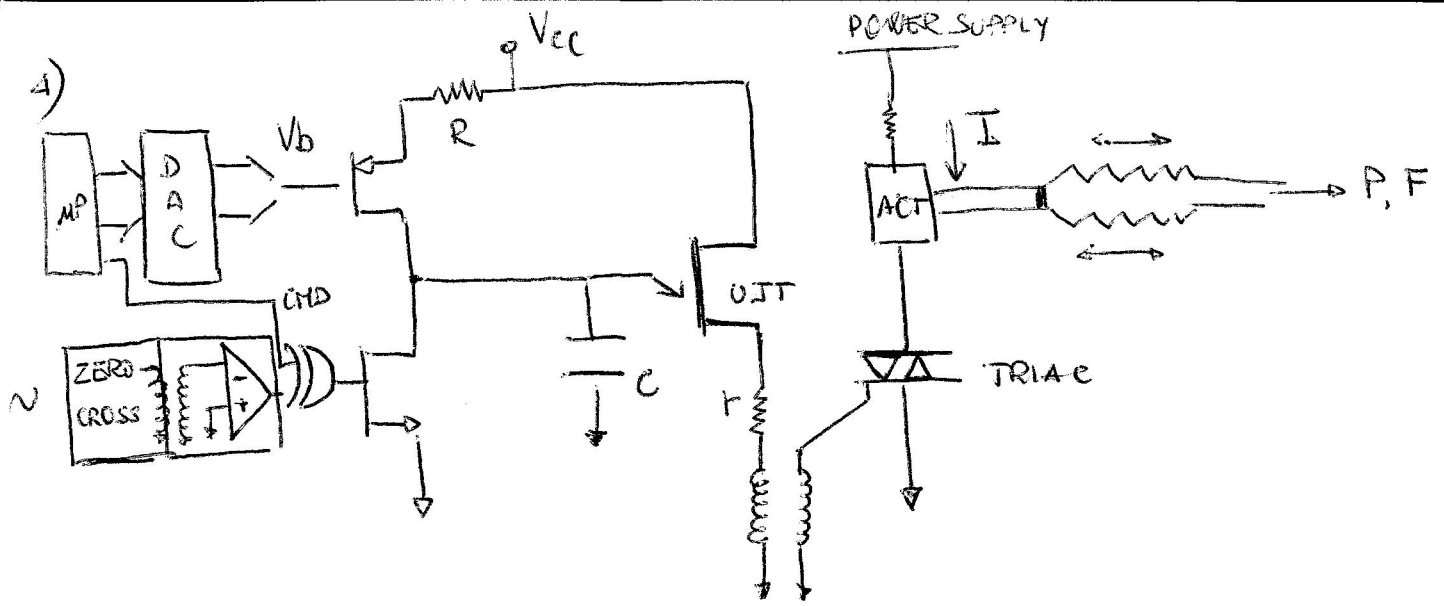
1) OPEN THE INSPIRATORY VALVE
AND CLOSE THE EXPIRATORY ONE

2) PAUSE FOR THE EXCHANGE

3) OPEN THE EXPIRATORY VALVE
AND CLOSE THE INSPIRATORY ONE

4) MONITOR THE ECG FREQUENCY
AND TRANSMIT THE INFORMATION

4 SHIT PREDICTORS

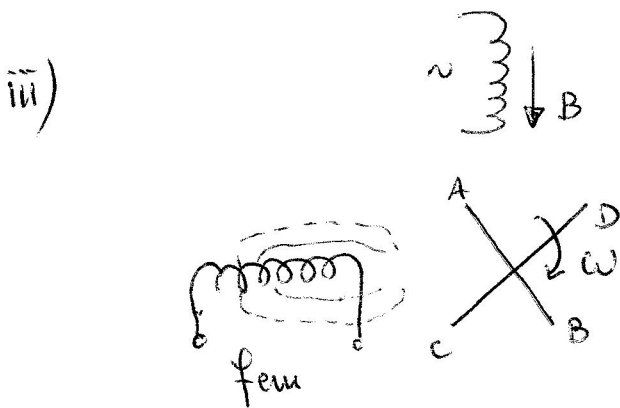


5) QUESTIONS

i) $ADC = \log_2 50 \rightarrow 6 \text{ bits}$ ACTUATOR (PREVIOUS CIRCUIT) = DAC + CMD = 7
 VALUES if ON OFF 1 bit each one; if with GATES SAME AS BEFORE

ii) SEE "ACTUATORS" SLIDES 15-16-17

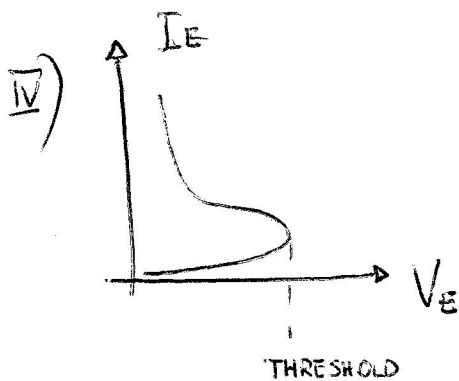
HYPOTHESIS: Knowledge "a priori", redundancy (more transducer + control algorithms)
 process works at $s=0$? or not?



$$f_{em} = \sum_{1}^N V_0 \cos \omega t$$

N = NUMBER OF SYMMETRIC COUPLES OF WILS

V_0 = f_{em} INDUCED BY B IN EACH COUPLE



WHEN THE V_E REACHES THE THRESHOLD $\frac{2}{3} V_{cc} + V_g$ THE PN JUNCTION POLARISES AND A HUGE SET OF POSITIVE CHARGES WILL OCCUPY THE AREA OF THE UJT BETWEEN E AND B₂. THIS CAUSES A DECREASE OF THE RESISTANCE AND OF THE ΔV NECESSARY TO THE CHARGES TO CROSS THE BORDER. THEREFORE I_E INCREASES

