



**POLITECNICO**  
MILANO 1863

## Dynamics and Control of Chemical Processes

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### Lab #7: Introduction to dynamic simulation

#### Exercise 1

Design a strategy to control the inlet flowrate and the liquid level of a 3 m<sup>3</sup> tank. Assume the following steady-state conditions:

Feed	
Temperature (°C)	25
Pressure (bar g)	3
Mass Flow (kg/h)	4000
Composition (Mole Fraction)	0.80 H <sub>2</sub> O 0.04 O <sub>2</sub> 0.16 N <sub>2</sub>

To control the first variable, use a control valve with 1 bar pressure drop in the inlet stream. The liquid level is controlled by manipulating the liquid outlet flowrate, with a 1 bar pressure drop valve. Both controllers are of PI type, first ( $K_c = 0.5$  and  $T_i = 1$  min) keeps the flow at the steady-state value and second ( $K_c = 0.5$  and  $T_i = 5$  min) the liquid level at 50%.