MBSD Lab #2

# Tank level control algorithm description

The purpose of the item is to control the level of a tank and to check if the pumps are working properly.

This software unit shall be implemented as a periodic task with a period of 100 ms (10 Hz)

The purpose of the controller is to keep the level 𝑙 at 180 cm, using the LFP if the level is between 180 and 150 cm, and the HLP in the case the level is below 150 cm.

Due to this limitation, it is better to define the control law as a hysteresis cycle with different thresholds for the ON and OFF conditions of the two pumps.

When the level is decreasing

While, when the level is increasing

The two pumps cannot be turned on at the same time.

## External physical interfaces

|  |  |  |
| --- | --- | --- |
| **Name** | **Direction** | **Type** |
| **Level\_cm** | Input | Analog |
| **Out\_Flow\_m3/s** | Input | Analog |
| **Error\_DO** | Output | Discrete |
| **LFP\_DO** | Output | Discrete |
| **HFP\_DO** | Output | Discrete |

Description of the whole system

*Draw the I/O block diagram of the plant and of the controller, showing how they interact to each other.*

*Draw the Finite State Machine (FSM) representing the on/off control logic*

*Draw the FSM representing the plausibility check on the level behavior.*

# Controller SW Unit specifications

*Provide a brief description of the Controller functionalities and its interfaces.*

## Interfaces

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Unit\*** | **Type** | **Data Type** | **Dimension** | **Min** | **Max** |
|  |  |  |  |  |  |  |