A black and white drawing of a building

Description automatically generated with low confidence

**Control of a Mobile Platform in LabView Environment**

**Laboratory report 03**

**Microcontroller Laboratory Exercise**

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# Task 01: Study the LabVIEW environment and the items of the template project!

We have investigate the LabView environment and the project template, we will implement everything on the “Starter Kit RT Host” VI. We have a project navigator where we can go around the project elements, connect and disconnect from the robot.

# Task 02: Implement the algorithm (4.8)-(4.10) and deploy it to the robot!

This task we implemented a reckoning algorithm (3 equations: 4.8 to 4.10 as shown below)

A picture containing text

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Here is an implementation on LabView:

Diagram

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After deployed into a robot and run we can see an estimation of the position (x, y) and orientation () as below:

Chart

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# task 03: Measure the error of the position and orientation estimates obtained using dead reckoning after a motion sequence.

For error measurement we compare the estimated value that we got form reckoning algorithm with the measured value from the digital compass. Here we show the implementation of error of orientation which also included in the previous task so here we will just show it again with a highlight part of the measurement error:

Diagram

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We created an indicator for the orientation error which we can continuously monitor from the front panel (we skipped the position error due to instruction from the lab instructor):

A picture containing text, indoor

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# Task 04: Increase the diameter of one of the wheels, and measure again the error of position and orientation estimates.

We skipped this one due to the instruction of the lab instructor.

# Task 05: Implement and deploy the Kalman-filter for the estimation of the orientation and check if the filter can compensate the wheel diameter errors thanks to the digital compass

In this task we implemented a Kalman-filter following a suggestion step in the lab guide:

|  |  |
| --- | --- |
| **Step:** | **Formula:** |
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| 3 | Text, letter  Description automatically generated |
| 4  &  5 | Text, letter  Description automatically generated |
| 6 | Text, letter  Description automatically generated |
| 7 | Text, letter  Description automatically generated |

In LabView, this is how we implemented it:

Diagram, schematic

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An we created an indicator for these output in the front panel as well as shown in the green box below:

A screenshot of a computer

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