Project 3

ISS eng. | Ekre Ceannmor

1. Requirements

1. Implement a PID controller to balance a ball on the ruler. All three coefficients in PID must be non-zero.
2. Implement serial communication to change the balancing position at runtime. E.g. by sending `10`, the robot will try to re-balance the ball to position marked "10" on the ruler.
3. The ball should be automatically re-balanced on the set position if physically disrupted.
4. Calibrate the PID controller to achieve a smooth response.
5. Implement all functions declared in the project template. Add own functions or change signatures if necessary.

2. Defence

1. The robot should be able to balance the ball at arbitrary positions specified at runtime, and react to physical disruptions of the ball.
2. When the ball is being balanced, it should stabilize. The speed of the ball becoming stationary after the new position is specified affects the grade (faster is better).

3. External reources and citations

If you want to copy your code from an external resource (official docs, stackoverflow, blogs, etc), you must provide a citation in a form of a code comment with a direct link. No additional explanation is necessary.
Example citation:

```
int numbers[] = {1,2,3};

// https://stackoverflow.com/questions/394767/pointer-arithmetic
int *third = numbers + 2;
printf("The third number is %d.\n", *third);
```

You do not need to cite:

- Your own code
- Code copied from the teacher's github repository

During the defence, if your code is not cited properly, you may receive point dedductions.
A citation does not relieve you from having to understand the code you defend.
Citations containing links to LLM services count as missing citations.