Report

- **Goal -1:**
  - The goal of the 1st task was to initialize parameters provided by the author of the assignment.
  - I wrote a client script (python) to initialize the parameters by calling the Server service **(/inverted_pendulum/set_params**).

- **Goal-2:**
  - The 2nd goal needed to have sinusoidal force acting upon the cart.
  - I have modeled the SInusoidal wave equation and published the values on topic: **/inverted_pendulum/control_force.**
  - The graph was plotted using rqt_plot.

- **Goal-3:**
  - To balance the pendulum, I have used a PID controller.
  - Following are the steps to be taken to balance the pendulum.
    - Set the PID parameters.
    - get the current angle **(/inverted_pendulum/current_state).**
    - If the angle is not equal to the desired set_point. Implement a PID controller.
    - Tune the PID constants.
  - The graph was plotted using rqt_plot.

Note:

If the submission deadline had not been imposed then: I would have added **position hold** to the system.
Also, I would have tried the **LQR algorithm**.