ASSIGNMENT WEEK_1

Question 1

You are provided with the characteristics of thrust provided and drag experienced by the propeller as follows:
F_i (Thrust) = 5 * \omega^2 N
D_i = 13 * \omega^2 Nm
Given that the weight of the hexacopter is 120N. Following are the characteristics of different motors
\tau_1 = 134 / \omega Nm
\tau_2 = 104 / \omega Nm
\tau_3 = 74 / \omega Nm
\tau_4 = 44 / \omega Nm
Yon needs to produce a graph where you plot these characteristics and based on the graphs choose which motor will be best suited for our hexacopter. you need to write your code in a live script and submit the live script with us through a google form.
Note: The Graph should be properly annotated as was done in the example.

Question 2

Now that you already have tried your hands on the P controller, it's time to design a PD controller for a drone. This time we have places the drone on a planet having 5 times earth's gravity, and you need to design a controller (basically vary the thrust) which makes sure that the drone reaches 1m height (+/- .0001m) , but doesn't attain a height more than 1.2 m at any point during its trajectory.
Use controller.m file to code for thrust (u), a sample code is given to you, also one small change from the controller given in the example is that this time there will be gravity so think about how you would compensate for it (use params.gravity to access the value of acceleration due to gravity in this planes).

Instructions for Assignment 1 Q2

1) Download all the required files and extract them into your current directory
2) Right-click on the **runsim.m**, open it and remove % sign from %z_des = 1;
3) Save this file
4) Open **controller.m** and write code according to problem statement
5) After writing code, never try to run the **controller.m**, always run **runsim.m**.
6) For stability of the Quadrotor simulation, always try to change the values of kp and kv