

EN.530.663: Robot Motion Planning

Homework 10

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Problems

1. Write a *Matlab script* file for the *potential field method* for planar point robot cases (as shown in the handout). In this problem, you are asked to consider the exact same situation as in the handout. Of course, you will need to write a Matlab function for computing the gradient of potential functions, which in turn should be used in your main script file. The specifications are as follows:
 - Obstacles:
$$CB_1 = \begin{bmatrix} 0 & 50 & 50 & 0 \\ 25 & 25 & 50 & 50 \end{bmatrix}; CB_2 = \begin{bmatrix} 80 & 80 & 70 & 70 \\ 50 & 100 & 100 & 50 \end{bmatrix}.$$
 - initial and goal points: $q_I = \begin{pmatrix} 0.5 \\ 0.5 \end{pmatrix}; q_G = \begin{pmatrix} 95 \\ 95 \end{pmatrix}.$
2. Derive (13.19) in Chapter 13 (Section 13.1.2.4) in the textbook.

Submission Guideline

- Submit all your Matlab codes for Problem 1 in a single .zip file. Name your single zip file submission as “YourName.HW10.zip”. For example, “JinSeobKim.HW10.zip” for a single zip file. Submission will be done through “HW10_computational” on the Gradescope.
- Submit your answer to Problem 2 in a single pdf file to “HW10_analytical” on the Gradescope.
- Please make sure to include *all the necessary files*, even files that were submitted in the previous homework assignments (of course the codes must be updated if necessary so as to be error-free). If TAs try to run your function and it does not run, then your submission will have a significant points deduction.
- Make as much comments as possible so that the TAs can easily read your codes.