

# Electromagnetics

## 2022 Homework 6

Deadline: 2022/06/11 23:59pm

说明:

全用英文作答;

每道题要对所有小问作答, 要给出全部必要的推导过程, 计算题要算出最终的数值结果, 比如开根号之类的;

所有计算出来的结果如果有单位的物理量, 一定要写明单位;

如果是矢量, 一定要在字母上面加箭头;

如果相位的计算结果是比较特殊的数(比如  $\pi$ ,  $\pi/6$  之类的), 可以用弧度表示, 如果是很奇怪的数, 就用度 $^{\circ}$ 表示, 不要再换算成弧度;

每题的分数在括号中给出;

可以互相讨论, 也可以上网查, 但是不能抄袭, 也不能找别人代做;

所有的解答必须全部是手写的原件, 不接受扫描件与照片;

有问题请给老师或助教发邮件;

Textbook: Fundamentals of Applied Electromagnetics, 7th edition

Part I. Problems in textbook.

**2.6 (10 points) Do not need to do (b).**

**2.13 (20 points)**

**2.26 (20 points)**

**2.33 (30 points)**

**2.38 (30 points)**

**2.41 (30 points) Do not need to use the CD Module.**

**2.42 (50 points)**

**2.43 (10 points)**

**2.45 (30 points)**

**2.46 (20 points)**

Part II. Homemade.

**1. (50 points)** If a quarter wave transformer is used to match a load of  $3Z_0$  to a transmission line with characteristic impedance of  $Z_0$  at the frequency  $f_0$ , calculate the characteristic impedance of the transformer. Calculate the frequency range (should be around  $f_0$ ) within which the magnitude of the reflection coefficient on the  $Z_0$  line is less than  $1/3$ .

**2. (20 points)** Use terminated transmission line theory to recalculate the reflection coefficient you found for problem 8.9.