Physics 514, Winter Quarter 2018
Electrodynamics: Homework Assignment 6
Due Feb. 16, 5:00pm either 11:00am in class
or 10:45am in the instructor's mailbox.
Short problem set this week.

1. Consider the parallel-plate waveguide in vacuum we discussed in class consisting of two parallel conductors separated by a distance d, with the width of the waveguide w much greater than d (no fringing fields, etc.).
a. Find the characteristic impedance of the waveguide for the TEM mode (the ratio of the voltage amplitude between the conductors to the current amplitude down the guide).
b. For the TEM mode, find the phase velocity.
c. For the TM modes, find the cutoff frequencies.
d. For the TM modes, find the wave impedance (the ratio of the amplitude of **E** to the amplitude of **H**).
e. For the TM modes, find the phase velocity.
f. For the TM modes, find the guided wavelength λ_g.

2. Consider the lowest TE mode in a rectangular waveguide. Show that the time-average energy flow is in the direction of propagation and independent of position along the guide.

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