These problems are due on Friday, April 15.

These are two exercises using the parallel-plate wave guide presented in class.

1. In class I worked out the example of the two-dimensional wave guide with the electric field in the $\hat{y}$ direction. We call this the TE(m) mode. Work out the equivalent formula for the TM(m) mode.

2. Calculate the Poynting vector for the two-dimensional example I worked in class, i.e. the TE(m) mode. Show that the Poynting vector averaged over the cross section of the wave guide, i.e. averaged over the $x$-$y$ plane, has only a $z$ component.