ELEC 4700 Waveguide mode solving

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Due January 24 @ 6 pm (end of PA).

Goal In this PA you will use a free source mode solver to investigate modes in a ridge waveguide and study the effect of geometry and index changes.

Tasks

1. Download the mode solver code from the link provided on the web page and Unzip the file.
2. Create a folder in your 4700PAS repo (folder) called MS and place the code in that folder.
3. Open Matlab and add the entire folder to your path. Right click on folder to "Add to path".
4. Basic Simulation:
   (a) Open "examples/basic_fullvector.m" and run the file.
   (b) What modes is this example obtaining and how?
   (c) Change the number of modes to 10 and run. You will need to add a loop to plot each mode.
   (d) Edit *contourmode()* to use a *surf()* function. You will need to replace the contourc() function and remove some of the code following it. Also recommended to use "shading interp" with *surf()*.
      i. Plot the *real()* part of the mode.
      ii. Is *surf()* more useful then the contour?
5. Geometry changes:
   (a) Copy "examples/basic_fullvector.m" to a new file and make it run for single mode and only TE.
   (b) Now add a loop that changes the Ridge half-width from 0.325 to 1.0 in 10 steps. Plot the modes and N_{eff}. What happens as the ridge get very narrow? Why?
   (c) Make the mesh 8 times less dense. Change dx and dy. What happens?
6. Material changes:
   (a) Copy "examples/basic_fullvector.m" to a new file and make it run for single mode and only TE.
   (b) Now add a loop that changes the Ridge index from 3.305 to 3.44 in 10 steps. Plot the modes and N_{eff}. What happens as the index drops? Why?

Checkout When you are finished:

1. Add the code to the repo, commit it and push to Github:

```
git add *.m
git commit -a -m "PA 2"
git push origin master
```

2. Check that it worked, if it did, you're all set