ECE 5510 2D FEM Waveguide Simulator

Using the simulator

Install dependencies

Requires Python 3

```
pip install -r requirements.txt
```

Run the default simulator

```
python sim.py
```

Automatically runs the `uStrip.in` geometry at 1 GHz and plots the electric field distribution.

Does simple mesh resampling to get a finer mesh for the simulation.

Run simulator with options

```
usage: sim.py [-h] [--mode {profile,modes}] [--input
{parallelPlateWG.in,rectWG.in,stripLine.in,uStrip.in}] [--freq FREQ] [--resamples
RESAMPLES] [--grid GRID] [--n_eigen N_EIGEN]

optional arguments:
  -h, --help            show this help message and exit
  --mode {profile,modes}, -m {profile,modes}
                        Mode to run in. profile: Compute propagation and mode
profile at a specific frequency modes: (NOT FULLY WORKING) Compute the propagation
constant of the first N_EIGEN modes up to FREQ
  --input {parallelPlateWG.in,rectWG.in,stripLine.in,uStrip.in}, -i
{parallelPlateWG.in,rectWG.in,stripLine.in,uStrip.in}
                        Input file
  --freq FREQ, -f FREQ  Frequency to solve at (Default 1e9)
  --resamples RESAMPLES, -r RESAMPLES
                        Number of resamples (Default 3)
  --grid GRID, -g GRID  Field display grid size (Default 50)
  --n_eigen N_EIGEN, -n N_EIGEN
                        Number of eigenvalues to compute (Default 2)
```

Results