PHYS 396 Update

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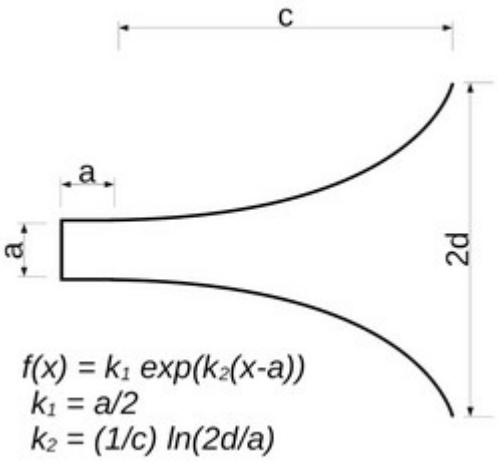
4/29/22

Creating Horn Antenna

- Working to make a good 2d representation of a horn antenna (with the right geometry)
- Once a 2d layout is made using Klayout, can be imported and made 3d using MEEP

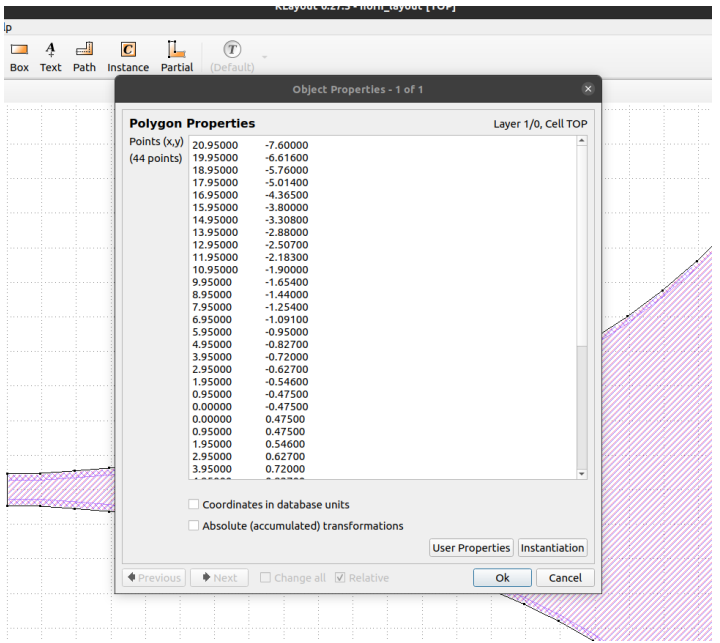
The Antenna We Want

- The geometry is defined by the following equations and parameters



Creating Using Klayout

- Can define polygons if you know its vertices
- How to calculate all these points?
- Python!

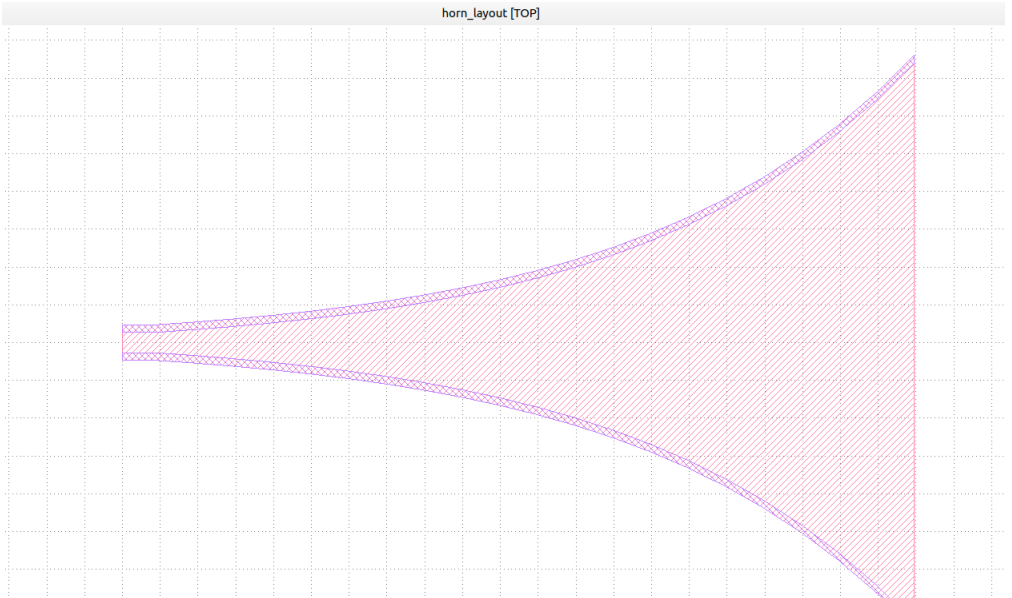


Defining Verticies

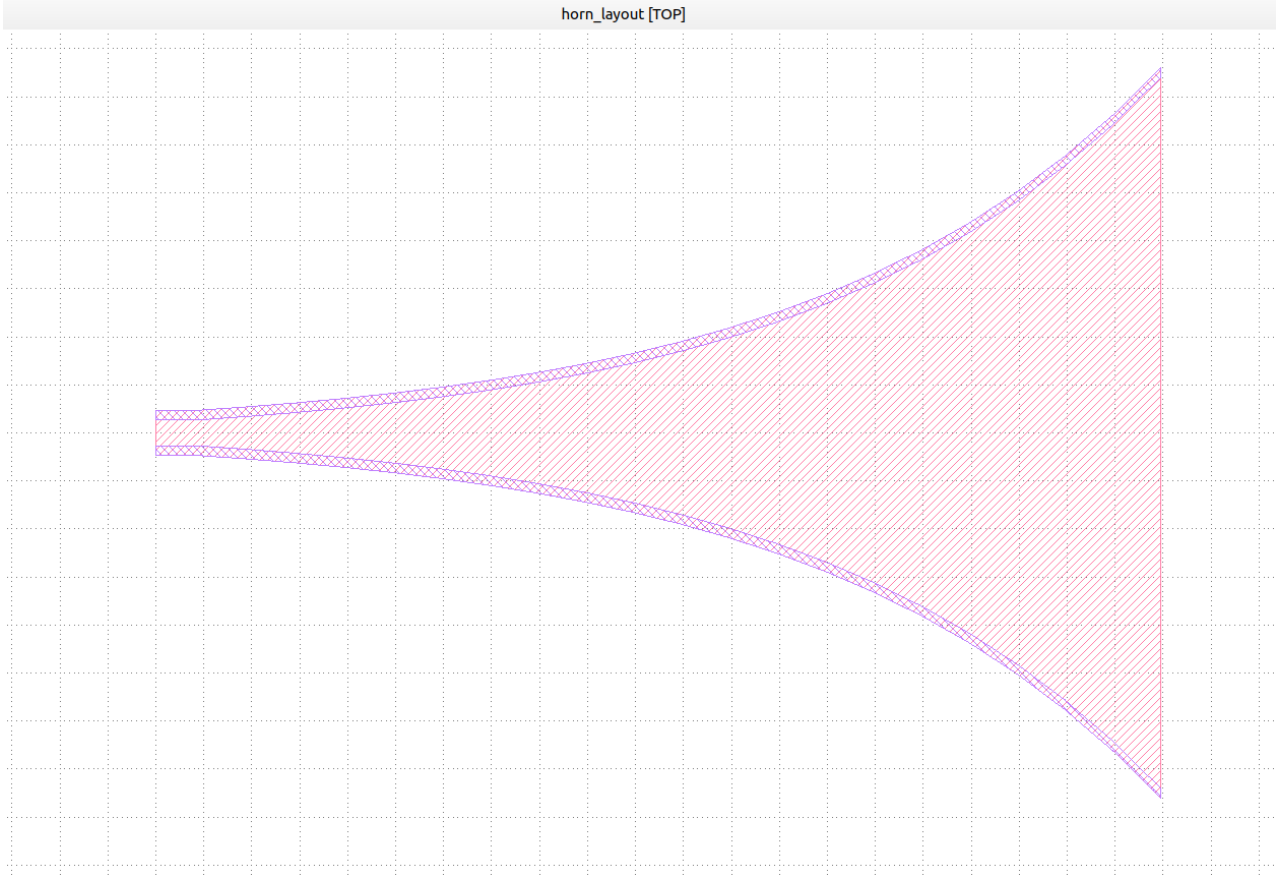
```
import math
import argparse

def main(args):
    x_org = 0

    a = args.a
    d = args.d
    c = args.c

    res = 20


    k_1 = a/2
    k_2 = (1/c)*math.log(2*d/a)

    f = open('./geometry.txt','w')

    f.write(f'{x_org}\t{a/2}\n')

    for x in range(res+1):
        x = x+a
        y = k_1*math.exp(k_2*(x-a))
        f.write(f'{x}\t{y}\n')

    for x in range(res+1):
        x = res-x
        x = x+a
        y =(-1)*k_1*math.exp(k_2*(x-a))
        f.write(f'{x}\t{y}\n')


    f.write(f'{x_org}\t{-a/2}\n')

if __name__ == '__main__':
    parser = argparse.ArgumentParser()
    parser.add_argument('-a',type=float)
    parser.add_argument('-c',type=float)
    parser.add_argument('-d',type=float)
    args = parser.parse_args()
    main(args)
```

Results

- Was able to use these techniques to create a layout which can be made 3d with empty space in middle (bottom layer, side supports, top layer)



Results



What’s Next?

- Import into MEEP, make 3d, and run some simulations