Calcback

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What is this?

Im coding a programm to get the complex refractive index $n = n * ik$ from the ellipsometric parameters Δ and Ψ I got from a simulation.

Imports:

```
import numpy as np
import matplotlib
from matplotlib import pyplot
```

Defining some variables:

Defining some variables for later use:

```
CSVFILE = "head300nmSiO2.csv"
phi_i = 70 * np.pi / 180
d_L = 300
n_air = 1
rerange = 5
imrange = 5
```

Read .csv-file:

Read the values into a two dimensional numpy array as [[lambda,Psi,Delta,n_S,k_S],...] (Skip columns 3 and 4)

```
csv = np.loadtxt(CSVFILE, usecols=(0,1,2,5,6),  delimiter=",", skiprows=1)
```

The array looks like this:

```
print(csv)
```

Calculate ρ

Create a matrix containing every possible refractive index (n+ik):

```
lsp_re = np.linspace(0.1, rerange, 101)
lsp_im = np.linspace(0.1, imrange, 101)
re, im = np.meshgrid (lsp_re, lsp_im, copy=False)
matrix = 1j * im + re
```

This gives the following matrix:

```
print(matrix)
```

for-Loop:

```
for n_L in matrix.flat:
    calc_rho(n_L, (csv[0,3]+1j*csv[0,4]))
```

Snell's Law:

```
def calc_rho(n_L, n_S):
  phi_L = np.arcsin((np.sin(phi_i)*n_air)/ n_L)
  phi_S = np.arcsin((np.sin(phi_L)*n_L)/ n_S)

print(phi_L)
print(phi_S)
```

Fresnel Equations:

Calculate rho (Fujiwara):