

260223-plotting-index-v-freq-in-class

February 25, 2026

1 Index of Refraction

We have had several equations for the index of refraction and I want to show them all to you and the different features and effects in each of them.

First, we will import some things, then I'll show the first equation, then the next, and finally I'll show what happens when light hits a metal.

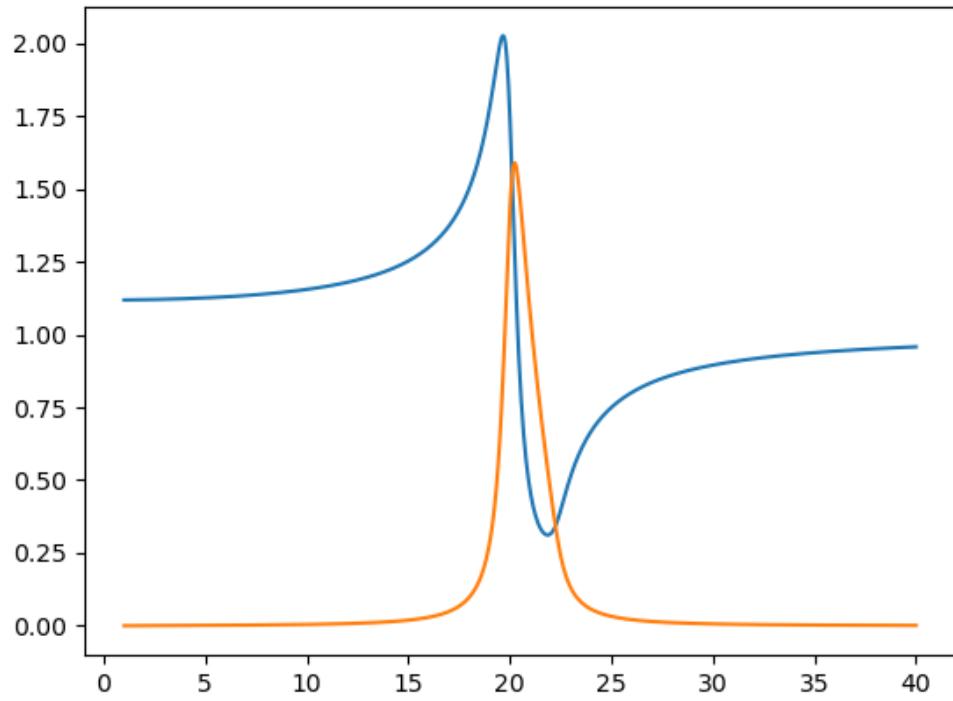
```
[5]: import numpy as np  
import matplotlib.pyplot as plt
```

So the first equation that we had for the index of refraction was this:

$$n = 1 +$$

```
[4]: def complexn(w, w0, wp, g):  
    return(np.sqrt(1+wp**2/(w0**2 - 1j*w*g-w**2)))  
  
w = np.linspace(1, 40, 1000)  
  
ntilde = complexn(w, 20, 10, 1)  
  
fig, ax = plt.subplots()  
ax.plot(w, ntilde.real)  
ax.plot(w, ntilde.imag)
```

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[4]: [<matplotlib.lines.Line2D at 0x7412f81eee70>]
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