ELEC 413 Project 1 Design Report – Rough Draft

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I followed the tutorial video for Lumerical Mode Modelling, except changed the wavelength to 1310nm and set the stop wavelength for frequency analysis to 1410nm. I got the following pictures from the modelling.

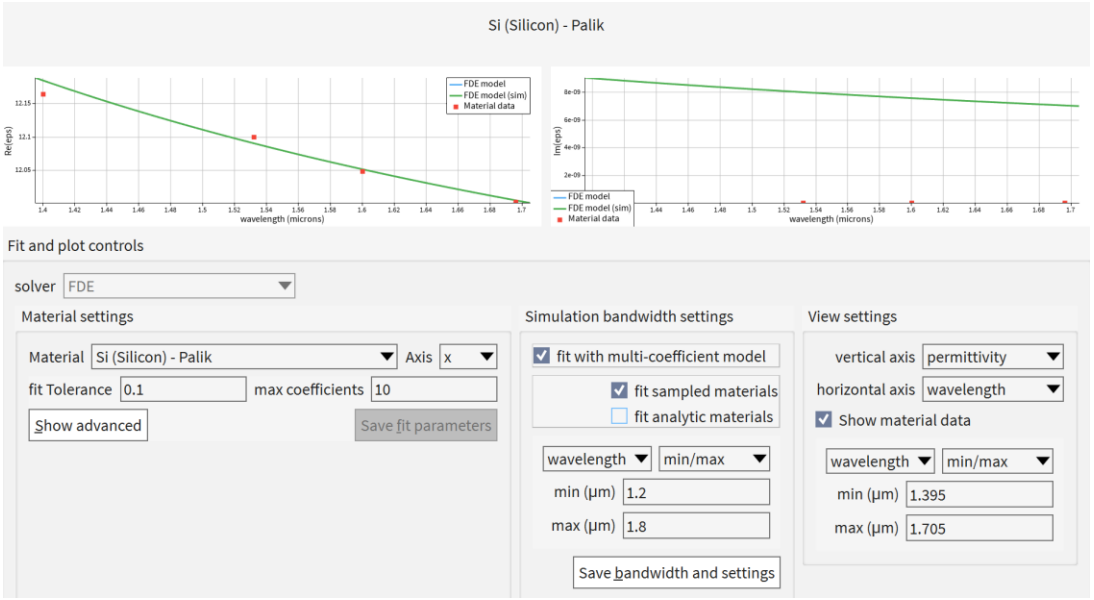

Figure 1 - Si Graph

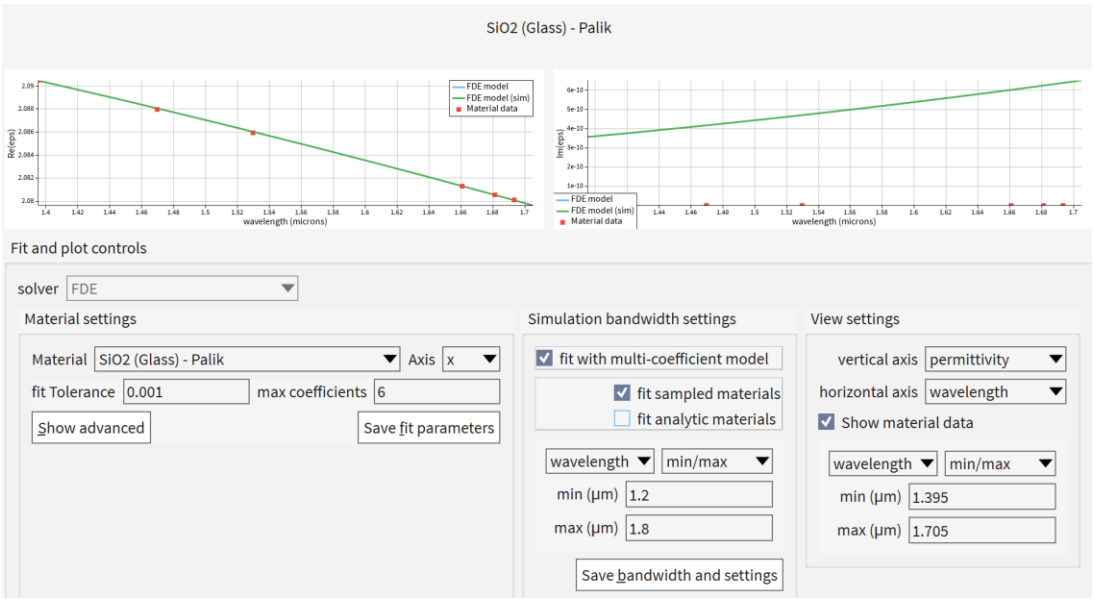

Figure 2 - SiO2 Graph

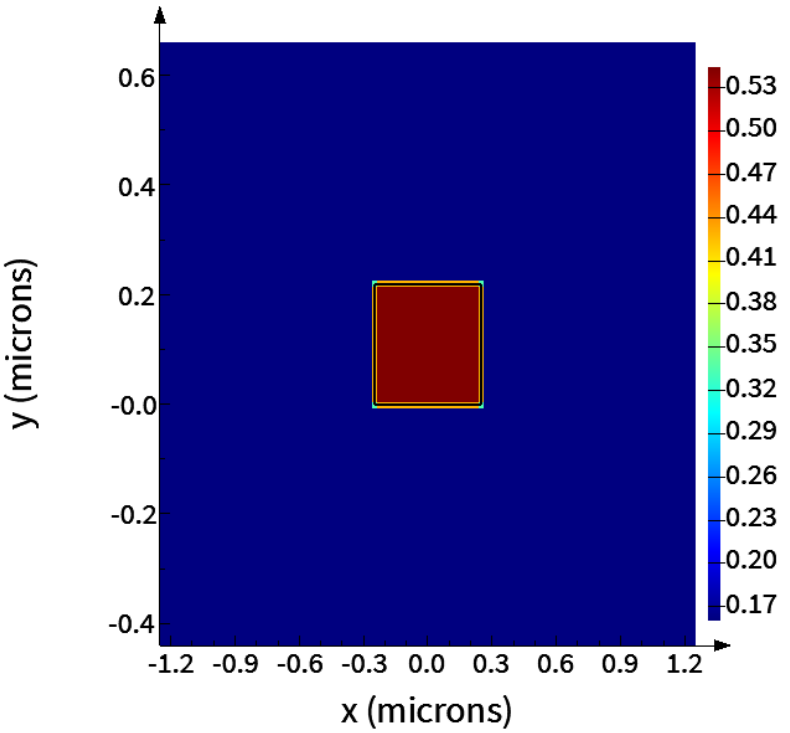

Figure 3 - Mesh Structure

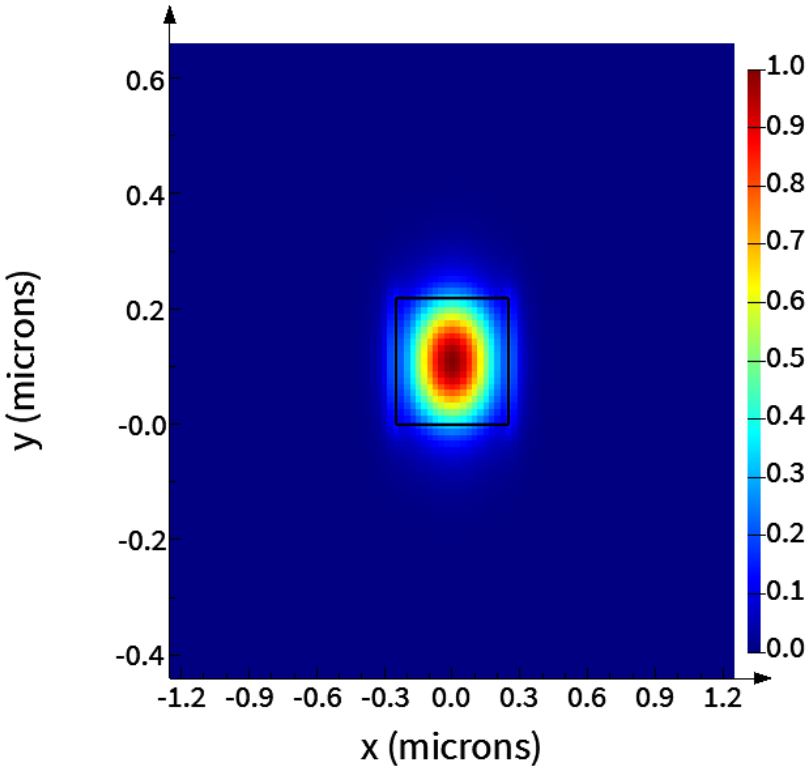

Figure 4 - Modal Analysis Linear Scale

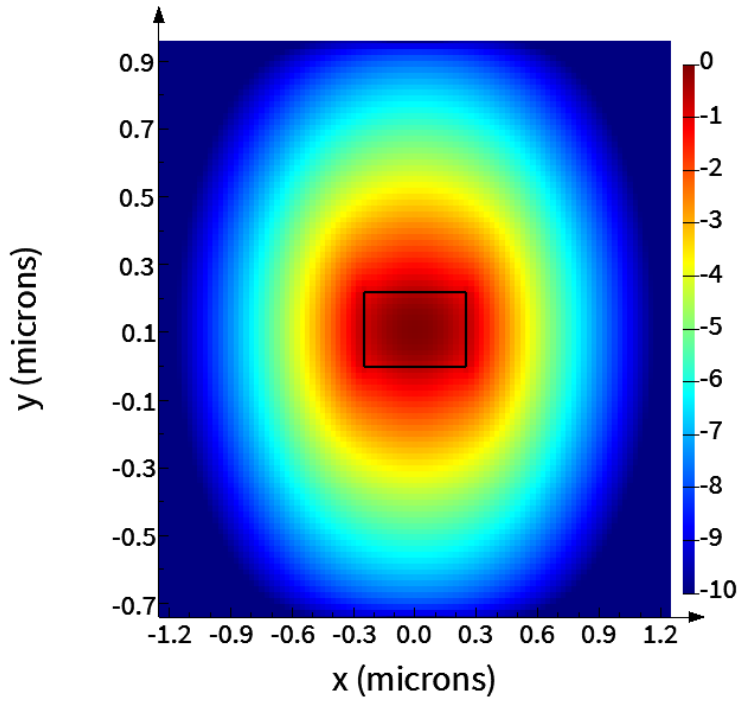

Figure 5 - Modal Analysis Log Scale

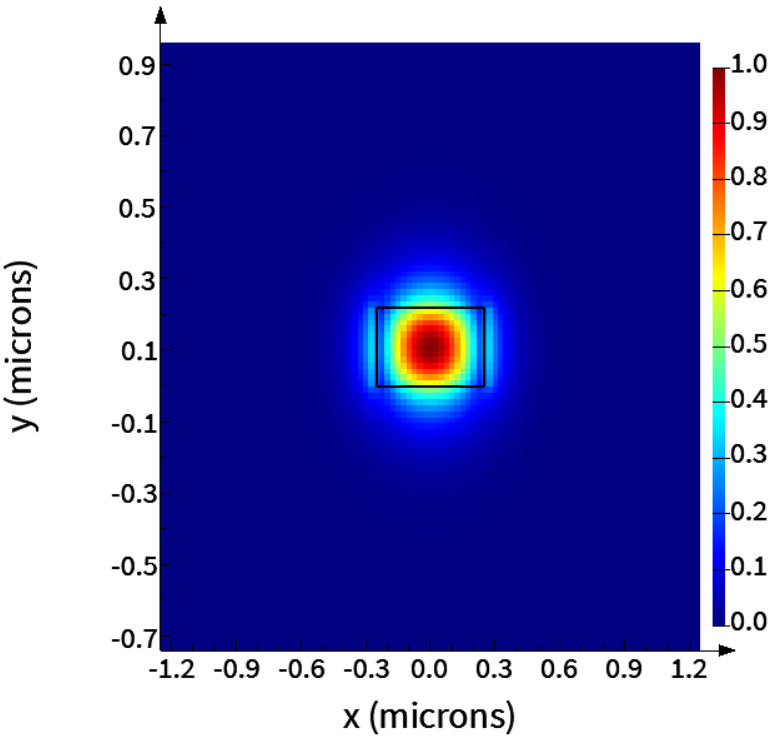

Figure 6 - Modal Analysis Ex Linear Scale

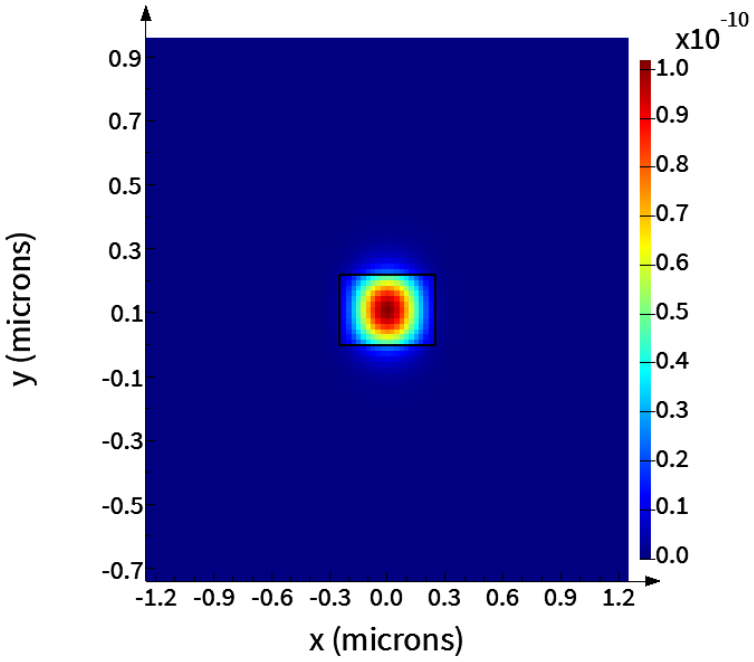

Figure 7 - Modal Analysis Energy Density Linear Scale

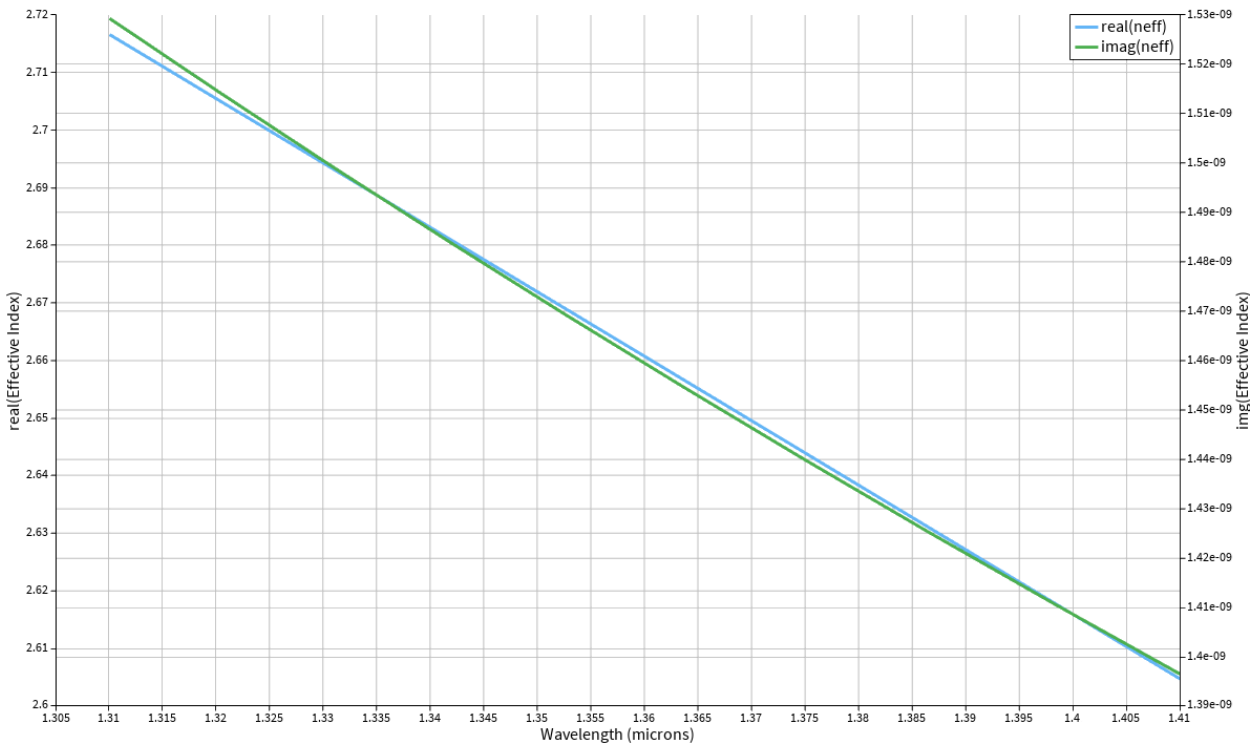

Figure 8 - Frequency Analysis Effective Index

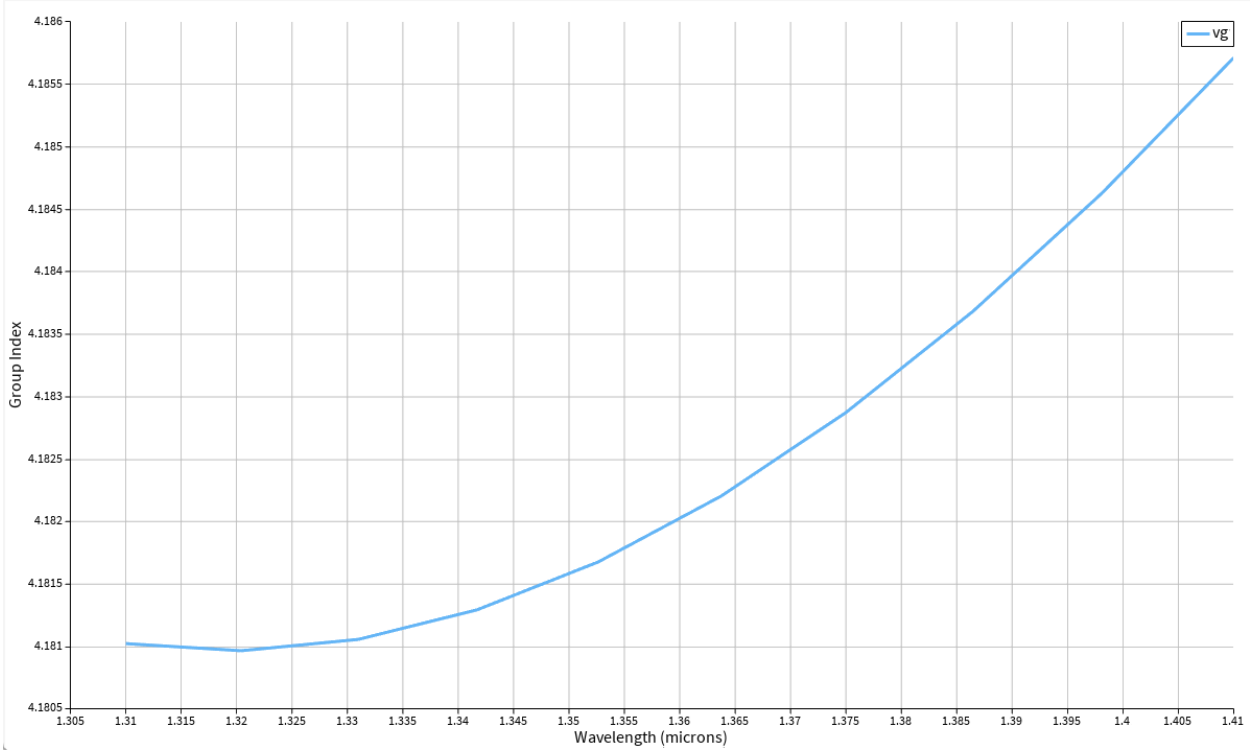

Figure 9 - Frequency Analysis Group Index

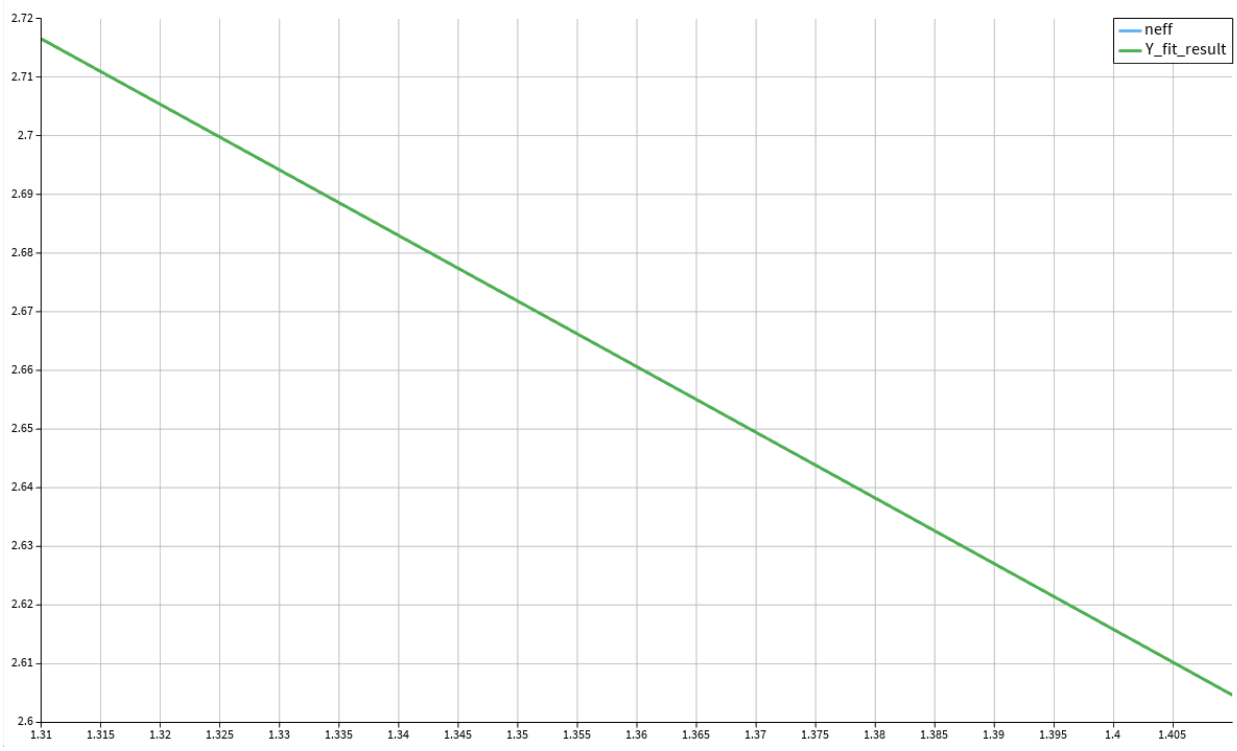

Figure 10 - Simulated Neff Data Polynomial Fit

Effective index of first mode (TE): 2.716522

Effective Index vs. Wavelength Polynomial Expression (obtained via script prompt using the provided code from tutorial): 2.44739 -1.12558*(lambda-1.31)-0.0175725*(lambda-1.31)^2

$$\Delta L = \frac{c}{n_g \cdot FSR} = \frac{3 \cdot 10^8}{4.181 \cdot 25\,GHz} = 2.87\,mm$$