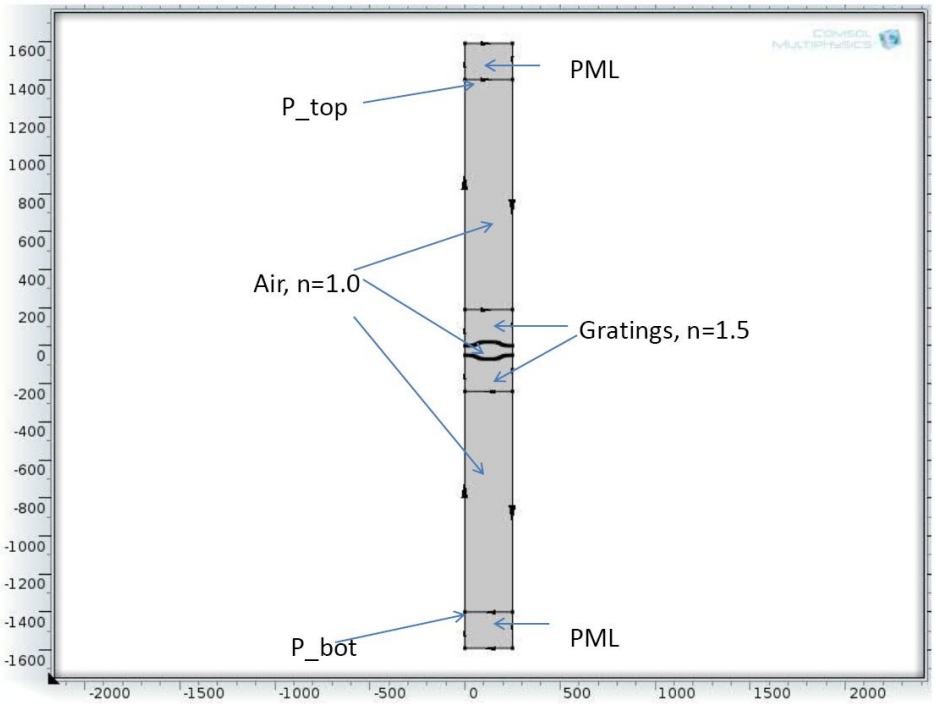
I am calculating one model including two parallel gratings. I want to calculate the transmission and reflection coefficients of two gratings. The incident angle of the light α can vary from 0 to pi/2.

Different from the model of "Plasmonic Wire Grating", where they use S-parameters and “port”, I used a scattering field and PMLs shown as the following figure.



I respectively integrated the outflow powers by ewm.nPoav at the bottom and top, donated by P_bot and P_top.

The transmission coefficient will be calculated by T=P_bot/I , where I is the total power of the incident light. And the reflection coefficient is expressed by R= (P_top+I) /I.

Note in above expression, the outflow at the top boundary contains two parts: the reflected light

(+) and the incident light (also is equal to the total power I). Therefore, the actual reflection is P_top+I

Moreover, the total power of the incident light I can be calculated by this way:

Change the refractive index of the gratings into 1. There is no any grating at this circumstance. calculate the out flow power at the bottom P'_bot: so the total power of the incident light under different incident angle is I*cos α=P'_bot*cos α , where α is the incident angle. Finally we can calculate R and T.

However, in my calculation I choose $\alpha = 0$, when there is no grating (n=1), P_bot =- P_top= 8.29506e-11. That is reasonable and I= 8.29506e-11. But when the grating index is changed into 1.5, the outflow power at the bottom is 4.20396e-10, which is bigger than = 8.29506e-11. It is unreasonable?

I am so confused by this calculation. By the way, is there any successful example by calculation the R/T coefficients for three media?