Homework #7:

1-2) The mirrors of a Fabry-Perot have a reflectivity of 97%, with incident light at normal incidence with wavelength 780 nm. The mirrors are 1 mm apart. Find a) the finesse, b) the FWHM (in frequency units), the resolving power, and the contrast factor defined as the ratio of the maximum transmitted intensity to the minimum transmitted intensity.

3) Derive the round-trip phase difference $\phi=2k\cos(\theta)$ by drawing a ray diagram and comparing the optical paths of the wave going around the cavity once with the wave that is directly reflected.

4-5) Brooker 5.5 (1) & (2)

6-7) Consider a Fabry-Perot made of mirrors with reflectivity $R$ and with a weakly absorbing medium inside. This can be modeled by assuming that the phase shift $\phi$ has a small positive imaginary part $\alpha$. Calculate the finesse and give a physical interpretation of your results.

8-9) Now let $\alpha=-g$ where $g>0$. This is a simple model of a laser. Assume no incident light. What is the minimum value of $g$ required to make the intensity inside the cavity non-zero?