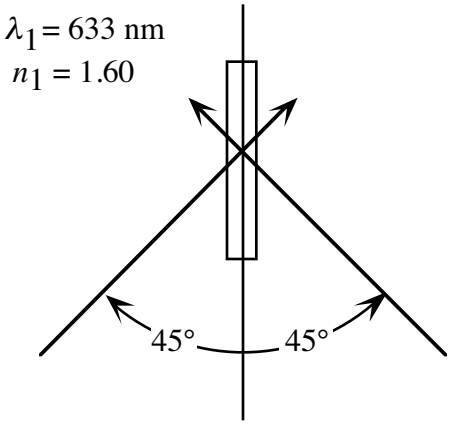
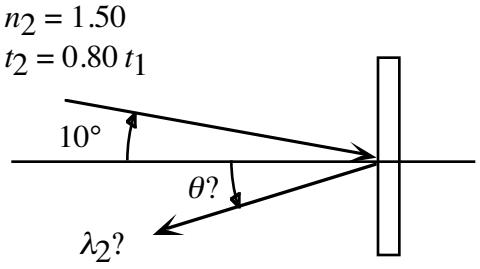
MAS.450/854: HOLOGRAPHIC IMAGING
Problem Set #5: Conformal Fringes and "Denisyuk" Holograms
due: Lecture 19

1. Conformal Fringes: An emulsion of refractive index 1.60 is exposed as shown in the left sketch. After processing, the emulsion has a refractive index of 1.50, and is found to have shrunk by 20%. Find the central wavelength and angle of the diffracted beam when the hologram is illuminated per the right sketch.





2. Holographic Focusing: A holographic plate is exposed with He-Ne laser light in the setup sketched below (distances are in millimeters). After processing, it is found to have shrunk by 5%. It is then viewed with an on-axis white-light point source two meters away. The average refractive index of the hologram is 1.0 during both exposure and viewing.

a) Find the location and magnification of the image if the hologram is illuminated from the glass side.

b) Find the location and magnification of the image if the hologram is illuminated from the emulsion side.