Physical Experiments I

Pre-lab Assignment

Experiment Title

Measurement of the Apex angle of a Prism and the Wavelength of Mercury Light Using a Spectrometer.

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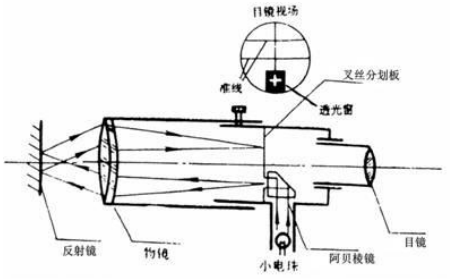
Score

Answers to Questions (20 points)

1. **what is autocollimation? Describe the concept briefly in words with the aid of a diagram.**
   Autocollimation is the parts that could help us to make sure if the telescope is pointing toward the objective directly and on the same level. Because the objective is ideal vertical and the beam generated by the electronic device in the telescope spreads toward that vertical objective. After reflection, it would come back to the telescope and should also focuses in the telescope (at upper level line). Only the telescope is pointing toward the object vertically, the reflected beam would focus on the upper level line as the beam generator is symmetry to the upper line about the middle line.

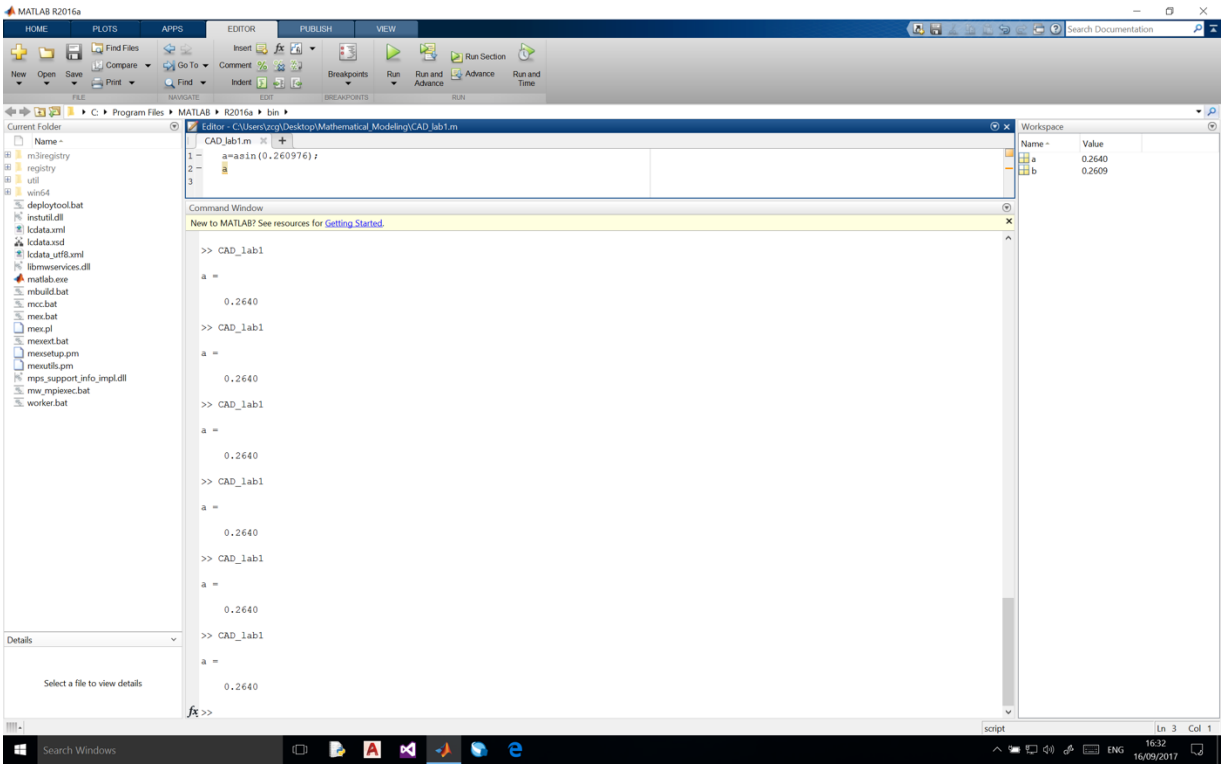


2. **Some of the grating used in lab have 600 lines/mm etched on them.**
   - **Find the distance, d, between the lines for such a grating.**
   - **Suppose the wavelength of the incident light is 435.83nm, compute the first-order diffraction angle.**
     From the calculation below, we can get the distance between the middle of one line in this grating to the next one's middle. It is:
     $d = 1.67\times10^{-7}m$
     Also, after the calculation below and with the help of the matlab. I can get the first-order angle:

     $\theta = 0.264\ radian$

$1mm = 1\times10^{-3}m$ $d = 1\times10^{-3}m/600 = \frac{1}{6}\times10^{-5}m/line = 1.67\times10^{-6}m/line$
$d\sin\theta = m\lambda$ (from physics PPT)

$\lambda = 435.83nm = 4.3583\times10^{-7}m$
$m = 1$
$\sin\theta = \frac{m\lambda}{d} = \frac{4.3583}{16.7} = 0.260976$
$\theta \approx 0.2640$


MATLAB R2016a
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libmwservices.dll
matlab.exe
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mcc.bat
mex.bat
mex.pl
mexext.bat
mexsetup.pm
mexutils.pm
mps_support_info_impl.dll
mw_mpiexec.bat
worker.bat
Details
Select a file to view details
Editor - C:\Users\zcg\Desktop\Mathematical_Modeling\CAD_lab1.m
CAD_lab1.m
1 a=asin(0.260976);
2 a
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Command Window
New to MATLAB? See resources for Getting Started.
>> CAD_lab1
a =
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16/09/2017