LAB EXERCISE: Reflection and Refraction

Use the MATLAB function "tmm.m" to plot the angular dependence of transmittance and reflectance across a boundary between two different, dispersion-less materials.

Consider the three following scenarios:

SCENARIO 1

- Input material water: n_input=1.33
- Output material: n_output=1
- TE Polarization

SCENARIO 2

- Input material water: n_input=1.33
- Output material: n_output=1
- TM Polarization

SCENARIO 3

- Input material air: n_input=1
- Output material water: n_output=1.33
- TM Polarization

Plot transmittance and reflectance as functions of the angle of incidence (from 0 to 89 degrees) for the three scenarios described above.

Recognize and take note of the Brewster angle and the critical angle in the transmittance and reflectance plots and compare them with the theoretical values derived from the boundary conditions.

Lab notes:

Scenario 1: $\theta_{Brewster} = $ —— $\theta_{critical} = $ ——

Scenario 2: $\theta_{Brewster} = $ —— $\theta_{critical} = $ ——

Scenario 3: $\theta_{Brewster} = $ —— $\theta_{critical} = $ ——