Special Topics Course ME 5374 “APPLICATIONS OF CONCENTRATING SOLAR THERMAL TECHNOLOGIES”
Spring 2024

Assignment 3

Read Chapter 2.3 to 2.4. (pages 70-78)

Using the information in the text and provided in the Lecture on Feb.1 (Calculation of incident solar radiation, combination of the text and Masters reference) Determine the Direct Incident Solar radiation (DNI) on a horizontal surface for a location corresponding to your home city for January 15 and July 15 at 1000 hours, solar noon, and 1500 hours for clear sky conditions. It is suggested that you set up these calculations on an Excel Spreadsheet or a Matlab code.

For January 15, calculate the half hour incident solar radiation on the horizontal surface, the incident angle and calculate the incident solar energy, kWh/m^2 per day. Plot the half hour values of the incident solar radiation and incident angle as a function of the time of day. Using the incident solar daily value, estimate a yearly incident solar energy value. Compare this value to that for solar tower power feasibility reported in Chapter 1 of your textbook. Would you recommend constructing a solar power tower in your location? (Discuss your result, this is not a yes/no answer and is intended to get you thinking of what the energy value stated in your text is based on)