Matt Russell, Joshua Ramayrat

Elen 123: Mechatronics

Prelab 2

4/17/17

1. The minimum size of our “wall” for use with the SHARP distance sensor is a little larger than 12 cm in diameter. At the very top of the datasheet we see under the “Features” section that “Detection Area Diameter @ 80 cm: 12 cm” which implies that, to ensure accurate sensing over the stated distance, our “wall” must be larger than this. Therefore, Dmin, wall = 12 cm = 0.12 m.
2. On page 4 of the IR333C’s datasheet is a graph of “Relative Radiant Intensity” vs. “Angular Displacement”. It seems that most of the light being emitted by the IR333C is located at the angle of 0o. On page 3, right before this graph, under “Electro-Optical” characteristics is the parameter “View Angle” which has attached to it the value 40o. Putting these two things together I would say that most of the emitted light will be between the two angles of -40o and 40o.
   1. The emission angle is the angle subtended by an area detected from the infrared sensor. The data sheet specifies that the view angle is 40 degrees, implying an angle of emission between 20 and -20 degrees.
3. The minimum distance from the wall to the sensor is computed through their trigonometric relationship where is the angle subtended by the detected area, *L* is the distance from the sensor to the wall, and *R* is the radius of the wall itself:

Knowing that and , the minimum distance is

1. 
2. The photo is relevant to this lab as it pertains to a view of the world from the perspective of the infrared spectrum. There are a spectral range of wavelengths that are either visible or invisible to the human eye. The infrared sensor being tested in this lab utilizes wavelengths in the infrared spectrum that are emitted by objects. By measuring the intensity of these wavelengths, the sensor allows the experimenter to determine the distance of an object with respect to the sensor itself.