CSC 445, Spring 2018, Assignment 2

Purpose: Coordinate Transforms

Due: 4:30pm, Thursday, February 15, 2018

Program: Coordinate Transforms

A robot is at pose $(1.0m, 0.5m, \frac{\pi}{4})$ in the inertial reference frame. It has a laser range finder mounted on the robot at $x = 0.2m, y = 0.0m, \theta = \pi$ with respect to the robot's frame of reference. The `scan.dat` file contains the distance measurements from the laser range finder. The first distance measurement is taken at the angle $\alpha = -\frac{\pi}{2}$ (in the laser range finder's frame of reference), the last distance measurement has $\alpha = \frac{\pi}{2}$, and all intermediate measurements are equal angular distances apart.

Create a Python script named `assignment2.py` that does the following:

1. Plots the laser end points in the laser sensor's frame of reference (use a scatter plot).
2. Use homogeneous transformation matrices to compute and plot the center of the robot, the center of the laser range finder, and all laser end-points in the inertial reference frame.

Turning in the Assignment

Create a zip file named assignment2.zip containing your source file and the scan.txt file and submit to the appropriate folder on D2L.