CENG 6533 HW 8 Robotics Due April 29

Homework Vehicles and Kinematics Spring 2015

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NOTE: Examination in Class May 11th starting at 4PM. Covers all the material in the course. Review your homeworks and previous exam and quiz carefully.

HW 1, Research: (60 Points)

1. Look up and report on the progress in autonomous vehicles. Be sure to include DARPA's contests and the Google car – among others.
2. Be sure to discuss various ways of navigating.
3. Be sure to discuss various ways of obstacle avoidance and safety issues.
4. As a reference, use at least one Journal Article such as an IEEE article from *IEEE Xplore* in our library (You can download these articles).

Search the WEB or other sources and create a table. Give the specifications such as speed, city or country, etc. NOTE: List all references - the web URL, books, etc. Give a brief discussion of the references.

2. 40 Points Do the Kinematic problems- 10 each.

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Robotics Hw 8 Matrices and Transformations

. Find the inverse of $\begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 5 \\ 1 & 5 & 12 \end{pmatrix}$ and check Answer! $AA^{-1} = I$

. Find the coordinates of $P: (5, \sqrt{3})$ after a rotation of 30° about the origin.

. For the point $\vec{v} = \begin{pmatrix} 1 \\ 2 \\ 3 \\ 1 \end{pmatrix}$;

a) rotate it 60° about the z axis

b) rotate the result in (a) by -90° about the y axis

c) what is the result if $\vec{v}$ is rotated -90° about the y axis and then rotated 60° about z?

Find the inverse of the transformation (and prove it)

$$\begin{bmatrix} 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 2 \\ -1 & 0 & 0 & 3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$