ECE 5397/6397: Introduction to Robotics, Spring 2016

HW #1 Due Feb. 2

Discrete Grading Policy. 5 points for each: 2 points for trying, 3 points if partial answer, 5 point if correct.

2. Verify Equation (2-11) for similarity transformations, namely

$$B = \left(R_1^0 \right)^{-1} A R_1^0 .$$

(If A is the matrix representation of a given linear transformation in $o_0 x_0 y_0 z_0$ and B is the representation of the same linear transformation in $o_1 x_1 y_1 z_1$ then A and B are related as (2-11))

(Alternative interpretation)

Given a point p, with p^0 and p^1 denoting its position in $o_0 x_0 y_0 z_0$ and $o_1 x_1 y_1 z_1$, respectively. The frame $o_0 x_0 y_0 z_0$ and $o_1 x_1 y_1 z_1$ can be related by rotation matrix R_1^0. If A is the matrix representation of a linear transformation for p in $o_0 x_0 y_0 z_0$, and B is the matrix representation of the same linear transformation for p in $o_1 x_1 y_1 z_1$. Show that

$$B = \left(R_1^0 \right)^{-1} A R_1^0 .$$