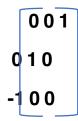
Robotics Homework Assignment # 4b

1) Do a Similarity Transformation that will represent the Matrix



within a reference frame that has been rotated about the Z axis by 45 degrees.

- 2) Write the Homogeneous Transformation Matrix for a 5cm coordinate translation along X-axis.
- 3) Write the Homogeneous Transformation Matrix for a 30 degree rotation with respect to the X axis
- 4) Write the Homogeneous Transformation Matrix for a 5 cm X-axis translation followed by a 30 degree rotation with respect to the X-axis.

Robotics Homework Assignment # 4

1) Do a Similarity Transformation that will represent the

100

Identity Matrix = 010

001

within a reference frame that has been rotated about the Z axis by 45 degrees.

- 2) Write the Homogeneous Transformation Matrix for a 5cm coordinate translation along X-axis.
- 3) Write the Homogeneous Transformation Matrix for a 30 degree rotation with respect to the X axis
- 4) Write the Homogeneous Transformation Matrix for a 5 cm X-axis translation followed by a 30 degree rotation with respect to the X-axis.

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VIGOMAR KIM ALGADOR
EEE 187 - 01
HOMEWORK 046
                             Cose -sine 0 0 1

R1 = sine cose 0 A= 0 1 0
                         B = (R_1^0)^{-1}AR_1^0 = \begin{bmatrix} \cos \theta & -\sin \theta & 0 \\ \sin \theta & \cos \theta & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ -1 & 0 & 0 \end{bmatrix} \begin{bmatrix} \cos \theta & \sin \theta & 0 \\ -\sin \theta & \cos \theta & 0 \\ 0 & 0 & 1 \end{bmatrix}
                                                                  \begin{bmatrix} \frac{62}{2} & -\frac{62}{2} & 0 \\ \frac{62}{2} & \frac{62}{2} & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ -1 & 0 & 0 \end{bmatrix} \begin{bmatrix} \frac{62}{2} & \frac{62}{2} & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \frac{1}{2} & -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} \\ -\frac{1}{2} & \frac{1}{2} & \frac{62}{2} & 0 \end{bmatrix}
         H = Trans<sub>x,5</sub> = 0 1 0 0 0 0 0 1 0
         3. \begin{bmatrix} 1 & 0 & 0 & 0 \\ Rot_{x,A} = \begin{bmatrix} 0 & C_{x} & S_{x} & 0 \\ 0 & S_{x} & C_{x} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}
\begin{bmatrix} 1 & 0 & 0 & 0 \\ Rot_{x,30} & = \begin{bmatrix} 0 & 5/2 & -1/2 & 0 \\ 0 & 1/2 & 5/2 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}
                  H = Rot x,30° = 0 45/2 -1/2 0 0 1/2 45/2 0 0 0 0 1
```

