



UNIVERSIDAD POLITÉCNICA
DE LA ZONA METROPOLITANA DE GUADALAJARA



TAREA 3

Cinemática De Robots



22 DE ENERO DE 2019
UPZMG 8.-B T/M
Jesús Alberto Garcia Camacho

$$X=60^\circ \quad Y=70^\circ \quad Z=10^\circ$$

$$X = 60 \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.5 & -0.866 \\ 0 & 0.866 & 0.5 \end{bmatrix} \quad Y = 70 \begin{bmatrix} 0.342 & 0 & 0.93 \\ 0 & 1 & 0 \\ -0.93 & 0 & 0.342 \end{bmatrix} \quad Z = 10 \begin{bmatrix} 0.985 & -0.174 & 0 \\ 0.174 & 0.985 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$X(Y) \begin{bmatrix} 0.342 & 0 & 0.93 \\ 0.814 & 0.5 & -0.296 \\ -0.47 & 0.866 & 0.17 \end{bmatrix} \quad Z(XY) \begin{bmatrix} 0.337 & -0.060 & 0.93 \\ 0.888 & 0.350 & -0.296 \\ 0.312 & 0.935 & 0.171 \end{bmatrix}$$

$$X=40^\circ \quad Y=10^\circ \quad X=50^\circ$$

$$X = 40 \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.766 & -0.643 \\ 0 & 0.643 & 0.766 \end{bmatrix} \quad Y = 10 \begin{bmatrix} 0.985 & 0 & 0.174 \\ 0 & 1 & 0 \\ -0.174 & 0 & 0.643 \end{bmatrix} \quad X = 50 \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.643 & 0.766 \\ 0 & 0.766 & 0.643 \end{bmatrix}$$

$$X(Y) = \begin{bmatrix} 0.985 & 0 & 0.174 \\ 0.112 & 0.766 & -0.633 \\ 0.133 & 0.647 & 0.754 \end{bmatrix} \quad X(XY) = \begin{bmatrix} 0.985 & 0 & 0.124 \\ 0.112 & 0.766 & 0.635 \\ 0.133 & 0.643 & 0.754 \end{bmatrix}$$

$$X=20^\circ \quad Z=18^\circ \quad X=30^\circ$$

$$X = 20 \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.940 & -0.343 \\ 0 & 0.343 & 0.940 \end{bmatrix} \quad Z = 18 \begin{bmatrix} 0.951 & -0.309 & 0 \\ 0.309 & 0.651 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad X = 30 \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.866 & -0.5 \\ 0 & 0.3 & 0.866 \end{bmatrix}$$

$$X(Z) \begin{bmatrix} 0.951 & -0.309 & 0 \\ 0.290 & 0.894 & -0.343 \\ 0.105 & 0.326 & 0.940 \end{bmatrix} \quad X(XZ) \begin{bmatrix} 0.951 & -0.267 & 0.54 \\ 0.290 & 0.602 & 0.744 \\ 0.105 & 0.752 & 0.651 \end{bmatrix}$$

$$X=30^\circ \quad Z=10^\circ \quad Y=30^\circ$$

$$X = 30 \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.866 & -0.5 \\ 0 & 0.5 & 0.866 \end{bmatrix} \quad Z = 10 \begin{bmatrix} 0.985 & -0.174 & 0 \\ 0.174 & 0.985 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad Y = 30 \begin{bmatrix} 0.866 & 0 & 0.3 \\ 0 & 1 & 0 \\ 0.5 & 0 & 0.866 \end{bmatrix}$$

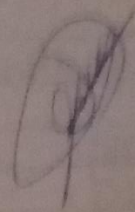
$$X(Z) \begin{bmatrix} 0.985 & -0.174 & 0 \\ 0.150 & 0.853 & -0.5 \\ 0.087 & 0.492 & 0.866 \end{bmatrix} \quad Y(XZ) \begin{bmatrix} 0.853 & -0.174 & 0.492 \\ 0.379 & 0.853 & -0.358 \\ 0.356 & 0.492 & 0.793 \end{bmatrix}$$

$$Y=30^\circ \quad Z=10^\circ \quad X=30^\circ$$

$$Y = 30 \begin{bmatrix} 0.866 & 0 & 0.5 \\ 0 & 1 & 0 \\ -0.3 & 0 & 0.866 \end{bmatrix} \quad Z = 10 \begin{bmatrix} 0.985 & -0.174 & 0 \\ 0.174 & 0.985 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad X = 30 \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.866 & -0.5 \\ 0 & 0.5 & 0.866 \end{bmatrix}$$

$$Y(Z) \begin{bmatrix} 0.853 & -0.150 & 0.5 \\ 0.174 & 0.985 & 0 \\ 0.492 & 0.087 & 0.866 \end{bmatrix} \quad X(YZ) \begin{bmatrix} 0.855 & 0.120 & 0.508 \\ 0.174 & 0.853 & -0.162 \\ 0.492 & 0.508 & 0.706 \end{bmatrix}$$

Nome: Alfonso Davila Curso: Ge Data: 24-01-2019 - S-D-7/24



$$x=60^\circ \quad y=70^\circ \quad z=70^\circ$$

$$x=60^\circ \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.5 & -0.866 \\ 0 & 0.866 & 0.5 \end{bmatrix}$$

$$y=70^\circ \begin{bmatrix} 0.342 & 0 & 0.938 \\ 0 & 1 & 0 \\ -0.938 & 0 & 0.342 \end{bmatrix}$$

$$z=70^\circ \begin{bmatrix} 0.985 & -0.174 & 0 \\ 0.174 & 0.985 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$x(y) \begin{bmatrix} 0.342 & 0 & 0.938 \\ 0.871 & 0.5 & -0.296 \\ -0.938 & 0.866 & 0.771 \end{bmatrix}$$

$$z(y) \begin{bmatrix} 0.387 & -0.060 & 0.974 \\ 0.801 & 0.330 & -0.296 \\ 0.942 & 0.935 & 0.171 \end{bmatrix}$$

$$x=80^\circ \quad y=70^\circ \quad x=50^\circ$$

$$x=80^\circ \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.174 & -0.985 \\ 0 & 0.985 & 0.174 \end{bmatrix}$$

$$y=70^\circ \begin{bmatrix} 0.342 & 0 & 0.938 \\ 0 & 1 & 0 \\ -0.938 & 0 & 0.342 \end{bmatrix}$$

$$x=50^\circ \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.643 & 0.766 \\ 0 & 0.766 & 0.643 \end{bmatrix}$$

$$x(y) \begin{bmatrix} 0.342 & 0 & 0.938 \\ 0.174 & 0.174 & -0.633 \\ -0.938 & 0.643 & 0.766 \end{bmatrix}$$

$$x(x) \begin{bmatrix} 0.985 & 0 & 0.174 \\ 0.174 & 0.766 & -0.633 \\ -0.133 & 0.643 & 0.766 \end{bmatrix}$$

$$x=80^\circ \quad z=18^\circ \quad x=50^\circ$$

$$x=80^\circ \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.985 & -0.174 \\ 0 & 0.174 & 0.985 \end{bmatrix}$$

$$z=18^\circ \begin{bmatrix} 0.951 & -0.309 & 0 \\ 0.309 & 0.951 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$x=50^\circ \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0.643 & 0.766 \\ 0 & 0.766 & 0.643 \end{bmatrix}$$

$$x(z) \begin{bmatrix} 0.951 & -0.309 & 0 \\ 0.270 & 0.599 & -0.543 \\ 0.105 & 0.309 & 0.990 \end{bmatrix}$$

$$x(x) \begin{bmatrix} 0.951 & -0.267 & 0.159 \\ 0.270 & 0.602 & -0.744 \\ 0.105 & 0.752 & 0.651 \end{bmatrix}$$