
Matrices - Automation Documentation

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EXAMPLE_6 MODULE

Example_6.**T** (*alpha*=0, *a*=0, *d*=0, *theta*=0, *degrees*=True)

Definition: Receives four arguments, *alpha* and *a*, being angle for rotation in the X axis and translation on the X axis. Also *d* and *theta*, being translation on the Z axis and Rotation on the Z axis. And returns the Multiplication of (Rotation matrix in X and the Translation in X) multiplied by (Rotation matrix in Z and the Translation in Z). It utilizes the np.matmul for matrix multiplication.

Parameters

- **alpha** (*float*) – Rotation Angle around the X axis
- **a** (*float*) – Distance translated on the X-axis
- **d** (*float*) – Distance translated on the Z-axis
- **theta** (*float*) – Rotation Angle around the Z axis
- **degrees** (*bool*) – Indicates if the provided angle is in degrees, if yes It will be converted to radians

Returns: A matrix with the Rotations and translations set.

Example_6.**T_rot_x** (*alpha*=0, *degrees*=True)

Definition: Receives an *alpha* angle and returns the rotation matrix for the given angle at the X axis. If the angle is given in radian degrees should be False.

Parameters

- **alpha** (*float*) – Rotation Angle around the X axis
- **degrees** (*bool*) – Indicates if the provided angle is in degrees, if yes It will be converted to radians

Returns: The Rotational Matrix at the X axis by an *alpha* angle

Example_6.**T_rot_z** (*theta*=0, *degrees*=True)

Definition: Receives an *theta* angle and returns the rotation matrix for the given angle at the Z axis. If the angle is given in radian degrees should be False.

Parameters

- **theta** (*float*) – Rotation Angle around the Z axis
- **degrees** (*bool*) – Indicates if the provided angle is in degrees, if yes It will be converted to radians

Returns: The Rotational Matrix at the Z axis by an *theta* angle

Example_6.**T_trans_x** (*a*=0)

Definition: Translate the matrix a given amount *a* on the X axis by Defining a matrix T 4x4 identity matrix with *a* (1,4) element position.

`np.float32`: creates the array with 16 float32 elements

`np.reshape`: `np.reshape` rearrange the array into a matrix with 4 lines and 4 columns

Parameters `a` (*float*) – Distance translated on the X-axis

Returns: The Translation Matrix on the X axis by a distance a

`Example_6.T_trans_z(d=0)`

Definition: Translate the matrix a given amount d on the Z axis. by Defining a matrix T 4x4 identity matrix with d (3,4) element position.

Parameters `d` (*float*) – Distance translated on the Z-axis

Returns: The Translation Matrix on the Z axis by a distance d

`Example_6.main()`

Definition: Complete a series of operations using the functions defined including: Defines a matrix with no rotation and no translation (Identity) Translation of a given distance on the X axis Second Translation of a given distance on the X axis Identity matrix multiplied by the first X translation multiplied by the second translation Rotation Matrix in X by a given angle Rotation Matrix in Z by a given angle Print them all