Matrices - Automation Documentation

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CHAPTER

ONE

MATRIXMANIPULATION MODULE

class MatrixManipulation.**Matrix**(***kwargs*)

Bases: object

Definition: This class generates Rotation and Translation matrices, that can be used to multiply any matrix and obtain the translation or rotation.

It uses *numpy* to generate the matrices:

np.float32: creates the array with 16 float32 elements

np.reshape: np.reshape rearrange the array into a 4X4 matrix

Returns: It returns Rotation and translation matrices.

Obs: **kwargs (keyword arguments) are used to facilitate the identification of the parameters, so initiate the object like: Matrix(x_angle='45', x_dist='100', z_angle='60', z_dist='100'), if an argument is not provided, the default 0 will be put to the argument.

rot_x(*gamma=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

- **gamma** (*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 *gamma* angle

rot_y(*beta=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

- **beta** (*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 *beta* angle

rot_z(*alpha=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

- **alpha** (*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 *alpha* angle

trans_x(*a=0*)

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

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

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

trans_y(*b=0*)

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

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

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

trans_z(*c=0*)

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

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

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

MatrixManipulation.**main**()

Example 3