**FUNCTION DESCRIPTIONS**

**Eaa2rotMat:**

**Inputs:**

**axis: Axis of rotation (does not care if it is a unitary vector)**

**angle: Angle in radians.**

**Outputs:**

**matrix: A 3x3 RotationMatrix.**

**Purpose:**

**Using the Rodrigues’ Rotation Formula to calculate a Rotation Matrix from an axis and an angle in radians.**

**eAngles2rotM:**

**Inputs:**

**Phi, theta, psi (the three Euler angles).**

**Outputs:**

**r\_euler\_matrix: A 3x3 RotationMatrix.**

**Purpose:**

**Using the Euler angles composition to calculate a Rotation Matrix.**

**eul2quat:**

**Inputs:**

**Phi, theta, psi (the three Euler angles).**

**Outputs:**

**quat: A quaternion.**

**Purpose:**

**Using the Euler angles composition to calculate a quaternion.**

**GetQuatFrom2Vec:**

**Inputs:**

**u, v (Two 3x1 vectors).**

**Outputs:**

**quat: A quaternion.**

**Purpose:**

**Using a formula to calculate a quaternion from two vectors.**

**GetRotVec:**

**Inputs:**

**radius: A radius in radians.**

**x, y: Coordinates in the plane.**

**Outputs:**

**vec: A projected vector in the virtual sphere which will be rotated.**

**Purpose:**

**Projecting a vector in a sphere to calculate the rotations dragging the mouse.**

**q\_product:**

**Inputs:**

**q\_A, q\_B (Two quaternions) to multiplicate.**

**Outputs:**

**q\_C: The resulting quaternion.**

**Purpose:**

**Calculate by the qvq’ system the product of two quaternions.**

**quat2eul:**

**Inputs:**

**quat (A quaternion).**

**Outputs:**

**eul: A 3x1 array containing phi, theta, psi in this order.**

**Purpose:**

**Calculate the three Euler angles from a provided quaternion.**

**rotM2eAngles:**

**Inputs:**

**euler\_matrix (A RotationMatrix).**

**Outputs:**

**phi, theta, psi (The three Euler angles).**

**Purpose:**

**Calculate the three Euler angles from a provided Rotation Matrix.**

**rotMat2Eaa:**

**Inputs:**

**rot\_matrix (A Rotation Matrix).**

**Outputs:**

**axis: A 3x1 array containing the axis of rotation.**

**angle: The angle of rotation (in radians).**

**Purpose:**

**Calculate the Euler principal axis and angle from a Rotation Matrix.**

**RotVec:**

**Inputs:**

**axis: The 3x1 axis of rotation.**

**angle: The angle in radians.**

**Outputs:**

**vec: A Rotation Vector containing axis and angle.**

**Purpose:**

**Compose a Rotation Vector with an unitary axis and an angle.**