

Exercises#4

KINEMATICS AND DYNAMICS Course ID: 01416308

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Not shared

\* Indicates required question

Sec No.? \*

Your answer

Student ID (Member No.1) \*

Your answer

Fullname (Member No.1) \*

Your answer

1. Pls select the correct answer. \*

1 point

What's the composition of rotation matrices? **R = ?**

- 1. Rotation of  $\pi/5$  radian about the **current** Z axis
- 2. Rotation of  $-\pi/3$  radian about the **fixed** X axis

$$a = \begin{bmatrix} 0.809 & -0.5878 & 0 \\ 0.2939 & 0.4045 & 0.866 \\ -0.509 & 0.7006 & 0.5 \end{bmatrix}$$
$$b = \begin{bmatrix} 0.809 & -0.5878 & 0 \\ 0.2939 & 0.4045 & -0.866 \\ -0.509 & -0.7006 & 0.5 \end{bmatrix}$$
$$c = \begin{bmatrix} 0.809 & -0.5878 & 0 \\ 0.2939 & 0.4045 & 0.866 \\ -0.509 & -0.7006 & 0.5 \end{bmatrix}$$
$$d = \begin{bmatrix} 0.809 & -0.5878 & 0 \\ 0.2939 & 0.4045 & 0.866 \\ -0.509 & -0.7006 & 0.5 \end{bmatrix}$$

- ☐ a)
- ☐ b)
- ☒ c)
- ☐ d)

2. Pls select the correct answer. \*

1 point

What's the composition of rotation matrices?

- 1. Rotation of 10 deg about the **current** Z axis
- 2. Rotation of 20 deg about the **fixed** Y axis
- 3. Rotation of -30 deg about the **fixed** X axis
- 4. Rotation of 40 deg about the **current** Z axis
- 5. Rotation of -50 deg about the **current** Y axis

$$R_z(\theta) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos \theta & -\sin \theta \\ 0 & \sin \theta & \cos \theta \end{bmatrix}$$
$$R_x(\theta) = \begin{bmatrix} \cos \theta & 0 & \sin \theta \\ 0 & 1 & 0 \\ -\sin \theta & 0 & \cos \theta \end{bmatrix}$$
$$R_y(\theta) = \begin{bmatrix} \cos \theta & -\sin \theta & 0 \\ \sin \theta & \cos \theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$a = \begin{bmatrix} 0.6503 & -0.7198 & -0.2429 \\ 0.7197 & 0.6877 & -0.122 \\ 0.2548 & -0.6945 & 0.9624 \end{bmatrix}$$
$$b = \begin{bmatrix} 0.6503 & -0.7198 & 0.2429 \\ 0.7197 & 0.6877 & -0.122 \\ 0.2548 & -0.6945 & 0.9624 \end{bmatrix}$$
$$c = \begin{bmatrix} 0.6503 & 0.7198 & -0.2429 \\ 0.7197 & 0.6877 & -0.122 \\ 0.2548 & 0.6945 & 0.9624 \end{bmatrix}$$
$$d = \begin{bmatrix} 0.6503 & -0.7198 & -0.2429 \\ 0.7197 & 0.6877 & -0.122 \\ 0.2548 & -0.6945 & 0.9624 \end{bmatrix}$$

- ☒ a)
- ☐ b)
- ☐ c)
- ☐ d)

3. Pls select the correct answer. \*

1 point

Find the rotation matrix equivalent to the ZX'Z'' Euler Angle (-150deg, -50deg, -90deg).

$$a = \begin{bmatrix} 0.3214 & -0.866 & 0.383 \\ 0.5567 & -0.5 & -0.6634 \\ 0.766 & 0 & 0.6428 \end{bmatrix}$$
$$b = \begin{bmatrix} -0.3214 & 0.866 & 0.383 \\ 0.5567 & 0.5 & -0.6634 \\ 0.766 & 0 & 0.6428 \end{bmatrix}$$
$$c = \begin{bmatrix} 0.3214 & -0.866 & 0.383 \\ 0.5567 & -0.5 & 0.6634 \\ 0.766 & 0 & 0.6428 \end{bmatrix}$$
$$d = \begin{bmatrix} -0.3214 & -0.866 & 0.383 \\ 0.5567 & -0.5 & -0.6634 \\ 0.766 & 0 & 0.6428 \end{bmatrix}$$

- ☐ a)
- ☐ b)
- ☐ c)
- ☒ d)

4. Pls select the correct answer. \*

1 point

If Vector p''(10, 9, -8) is rotated by rotation matrix equivalent to the ZX'Z'' Euler Angle (-150deg, -50deg, -90deg). Find the coordinate value p0(?, ?, ?).

$$a = \begin{bmatrix} 11.07 \\ 6.37 \\ -2.52 \end{bmatrix}$$
$$b = \begin{bmatrix} 6.37 \\ -2.52 \\ -14.07 \end{bmatrix}$$
$$c = \begin{bmatrix} 6.37 \\ 2.52 \\ -11.07 \end{bmatrix}$$
$$d = \begin{bmatrix} 6.37 \\ -2.52 \\ 2.52 \end{bmatrix}$$

- ☐ a)
- ☐ b)
- ☒ c)
- ☐ d)

5. Pls select the correct answer. \*

1 point

If Vector p0(2, 4, -1) is the results from rotation by rotation matrix equivalent to the ZX'Z'' Euler Angle (-150deg, -50deg, -90deg). Find the coordinate value p''(?, ?, ?).

$$a = \begin{bmatrix} 0.8178 \\ -3.7321 \\ -2.5304 \end{bmatrix}$$
$$b = \begin{bmatrix} 0.8178 \\ 3.7321 \\ 2.5304 \end{bmatrix}$$
$$c = \begin{bmatrix} 0.8178 \\ 3.7321 \\ -2.5304 \end{bmatrix}$$
$$d = \begin{bmatrix} -0.8178 \\ -3.7321 \\ 2.5304 \end{bmatrix}$$

- ☒ a)
- ☐ b)
- ☐ c)
- ☐ d)

6. Pls select the correct answer. \*

1 point

From the given rotation matrix equivalent to the ZX'Z'' Euler Angle, Find rotated angle in Z(φ) X'(θ) Z''(ψ) when theta (θ)'s in Quadrant 4

$$R = R_z(\phi)R_x(\theta)R_y(\psi) = \begin{bmatrix} -0.3214 & -0.866 & -0.383 \\ 0.5567 & -0.5 & 0.6634 \\ -0.766 & 0 & 0.6428 \end{bmatrix}$$

- a) Z(φ) = -150 deg, X'(θ) = 50 deg, Z''(ψ) = -90 deg.
- b) Z(φ) = 30 deg, X'(θ) = -50 deg, Z''(ψ) = 90 deg.
- c) Z(φ) = -30 deg, X'(θ) = -50 deg, Z''(ψ) = 90 deg.
- d) Z(φ) = 30 deg, X'(θ) = -50 deg, Z''(ψ) = -90 deg.

- ☐ a)
- ☐ b)
- ☐ c)
- ☐ d)

7. Pls select the correct answer. \*

1 point

Find the rotation matrix equivalent to the Roll-Pitch-Yaw angles (Rx(ψ) 90deg, Ry(θ) 200 deg, Rz(φ) 30deg).

$$a = \begin{bmatrix} -0.8138 & -0.2962 & 0.5 \\ 0.4698 & -0.171 & 0.866 \\ 0.342 & -0.9397 & 0 \end{bmatrix}$$
$$b = \begin{bmatrix} -0.8138 & -0.2962 & 0.5 \\ -0.4698 & 0.171 & -0.866 \\ 0.342 & 0.9397 & 0 \end{bmatrix}$$
$$c = \begin{bmatrix} -0.8138 & -0.2962 & 0.5 \\ 0.4698 & -0.171 & 0.866 \\ -0.342 & -0.9397 & 0 \end{bmatrix}$$
$$d = \begin{bmatrix} -0.8138 & -0.2962 & 0.5 \\ -0.4698 & -0.171 & -0.866 \\ 0.342 & -0.9397 & 0 \end{bmatrix}$$

- ☐ a)
- ☐ b)
- ☐ c)
- ☐ d)

8. Pls select the correct answer. \*

1 point

If Vector p''(5, 6, -7) is rotated by rotation matrix equivalent to the Roll-Pitch-Yaw angles (Rx(ψ) 90 deg, Ry(θ) 200 deg, Rz(φ) 30 deg). Find the coordinate value p0(?, ?, ?).

$$a = \begin{bmatrix} -9.3462 \\ -2.6869 \\ -3.9281 \end{bmatrix}$$
$$b = \begin{bmatrix} 9.3462 \\ 2.6869 \\ -3.9281 \end{bmatrix}$$
$$c = \begin{bmatrix} -9.3462 \\ 2.6869 \\ -3.9281 \end{bmatrix}$$
$$d = \begin{bmatrix} -9.3462 \\ -2.6869 \\ 3.9281 \end{bmatrix}$$

- ☐ a)
- ☐ b)
- ☐ c)
- ☐ d)

9. Pls select the correct answer. \*

1 point

From the given rotation matrix equivalent to the Roll-Pitch-Yaw angles, Find rotated angle in X(ψ) Y(θ) Z(φ) when theta (θ)'s in Quadrant 3.

$$R = R_x(\psi)R_y(\theta)R_z(\phi) = \begin{bmatrix} 0 & -0.866 & 0.5 \\ -0.766 & -0.3214 & -0.5567 \\ 0.6428 & -0.383 & -0.6634 \end{bmatrix}$$

- a) X(ψ) = 30 deg, Y(θ) = -140 deg, Z(φ) = 90 deg.
- b) X(ψ) = 30 deg, Y(θ) = -140 deg, Z(φ) = -90 deg.
- c) X(ψ) = 30 deg, Y(θ) = 220 deg, Z(φ) = 90 deg.
- d) a) and c) are correct.

- ☐ a)
- ☐ b)
- ☐ c)
- ☐ d)

10. Pls select the correct answer. \*

1 point

Find the unit quaternion that represents a rotation of 45° about (0, 0, k) and its inverse.

$$a) Q = (0.9238, 0, 0, 0.9238), Q^{-1} = (0.9238, 0, 0, -0.9238)$$
$$b) Q = (0.9238, 0, 0, -0.9238), Q^{-1} = (0.9238, 0, 0, 0.9238)$$
$$c) Q = (0.9238, 0, 0, 0.9238), Q^{-1} = (0.9238, 0, 0, -0.9238)$$
$$d) Q = (0.9238, 0, 0, 0.9238), Q^{-1} = (0.9238, 0, 0, -0.9238)$$

- ☐ a)
- ☐ b)
- ☐ c)
- ☐ d)

11. Pls select the correct answer. \*

1 point

Find the unit quaternion that is equivalent to the following rotation matrix

$$R = \begin{bmatrix} 0 & -1 & 0 \\ 0.866 & 0 & -0.5 \\ 0.5 & 0 & 0.866 \end{bmatrix}$$

$$a) Q = (0.683, 0.183, -0.183, 0.683)$$
$$b) Q = (0.683, -0.183, 0.183, 0.683)$$
$$c) Q = (0.683, 0.183, -0.183, -0.683)$$
$$d) Q = (0.683, -0.183, -0.183, 0.683)$$

- ☐ a)
- ☐ b)
- ☐ c)
- ☐ d)

12. Pls select the correct answer. \*

1 point

Find the rotation matrix that is equivalent to the following unit quaternion

The quaternion is Q = (0.9239, 0, 0, 0.3827), R = ?

$$a = \begin{bmatrix} 0.7072 & 0.7072 & 0 \\ 0.7072 & 0.7072 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$
$$b = \begin{bmatrix} 0.7072 & -0.7072 & 0 \\ -0.7072 & 0.7072 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$
$$c = \begin{bmatrix} 0.7072 & -0.7072 & 0 \\ 0.7072 & 0.7072 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$
$$d = \begin{bmatrix} 0.7072 & -0.7072 & 0 \\ 0.7072 & -0.7072 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

- ☐ a)
- ☐ b)
- ☐ c)
- ☐ d)

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Sec No.? \*

Your answer

Student ID (Member No.1) \*

Your answer

Fullname (Member No.1) \*

Your answer

1. Pls select the correct answer. \*

1 point

What's the composition of rotation matrices? **R = ?**

1. Rotation of  $\pi/5$  radian about the **current Z** axis  $R_z(\pi/5)$   $R_y(\pi/5)$   
2. Rotation of  $\pi/3$  radian about the **fixed X** axis  $R_x(\pi/3)$   $R_z(\pi/3)$

$$a = \begin{bmatrix} 0.809 & -0.5878 & 0 \\ 0.2939 & 0.4045 & 0.866 \\ -0.509 & 0.7006 & 0.5 \end{bmatrix}$$
  
$$b = \begin{bmatrix} 0.809 & -0.5878 & 0 \\ 0.2939 & 0.4045 & -0.866 \\ -0.509 & -0.7006 & 0.5 \end{bmatrix}$$
  
$$c = \begin{bmatrix} 0.809 & -0.5878 & 0 \\ 0.2939 & 0.4045 & 0.866 \\ -0.509 & -0.7006 & 0.5 \end{bmatrix}$$
  
$$d = \begin{bmatrix} 0.809 & -0.5878 & 0 \\ 0.2939 & -0.4045 & 0.866 \\ -0.509 & -0.7006 & 0.5 \end{bmatrix}$$

- ☐ a)  
☐ b)  
☒ c)  
☐ d)

2. Pls select the correct answer. \*

1 point

What's the composition of rotation matrices?

1. Rotation of 10 deg about the **current Z** axis  $R_z(10)$   $R_y(10)$   $R_x(10)$   $R_z(10)$   
2. Rotation of 20 deg about the **fixed Y** axis  $R_y(20)$   $R_z(20)$   $R_x(20)$   $R_z(20)$   
3. Rotation of -30 deg about the **fixed X** axis  $R_x(-30)$   $R_z(-30)$   $R_y(-30)$   $R_z(-30)$   
4. Rotation of 40 deg about the **current Z** axis  $R_z(40)$   $R_y(40)$   $R_x(40)$   $R_z(40)$   
5. Rotation of -50 deg about the **current Y** axis  $R_y(-50)$   $R_z(-50)$   $R_x(-50)$   $R_z(-50)$

$$R_z(\theta) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos \theta & -\sin \theta \\ 0 & \sin \theta & \cos \theta \end{bmatrix}$$
  
$$R_y(\theta) = \begin{bmatrix} \cos \theta & 0 & \sin \theta \\ 0 & 1 & 0 \\ -\sin \theta & 0 & \cos \theta \end{bmatrix}$$
  
$$R_x(\theta) = \begin{bmatrix} \cos \theta & -\sin \theta & 0 \\ \sin \theta & \cos \theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$a) \begin{bmatrix} 0.6503 & -0.7198 & -0.2429 \\ 0.7197 & 0.6877 & -0.122 \\ 0.2548 & -0.6945 & 0.9624 \end{bmatrix}$$
  
$$b) \begin{bmatrix} 0.6503 & -0.7198 & 0.2429 \\ 0.7197 & 0.6877 & -0.122 \\ 0.2548 & -0.6945 & 0.9624 \end{bmatrix}$$
  
$$c) \begin{bmatrix} 0.6503 & 0.7198 & -0.2429 \\ 0.7197 & 0.6877 & -0.122 \\ 0.2548 & 0.6945 & 0.9624 \end{bmatrix}$$
  
$$d) \begin{bmatrix} 0.6503 & -0.7198 & -0.2429 \\ 0.7197 & 0.6877 & -0.122 \\ 0.2548 & -0.6945 & 0.9624 \end{bmatrix}$$

- ☒ a)  
☐ b)  
☐ c)  
☐ d)

3. Pls select the correct answer. \*

1 point

Find the rotation matrix equivalent to the ZX'Z'' Euler Angle (-150deg, -50deg, -90deg).

$$a) \begin{bmatrix} 0.866 & -0.866 & 0.383 \\ 0.5567 & 0.5 & -0.6634 \\ 0.766 & 0 & 0.6428 \end{bmatrix}$$
  
$$b) \begin{bmatrix} -0.3214 & 0.866 & 0.383 \\ 0.5567 & 0.5 & -0.6634 \\ 0.766 & 0 & 0.6428 \end{bmatrix}$$
  
$$c) \begin{bmatrix} 0.3214 & -0.866 & 0.383 \\ 0.5567 & -0.5 & 0.6634 \\ 0.766 & 0 & 0.6428 \end{bmatrix}$$
  
$$d) \begin{bmatrix} -0.3214 & -0.866 & 0.383 \\ 0.5567 & -0.5 & -0.6634 \\ 0.766 & 0 & 0.6428 \end{bmatrix}$$

- ☐ a)  
☐ b)  
☐ c)  
☒ d)

4. Pls select the correct answer. \*

1 point

If Vector p''(10, 9, -8) is rotated by rotation matrix equivalent to the ZX'Z'' Euler Angle (-150deg, -50deg, -90deg). Find the coordinate value p0(?, ?, ?).

$$a) \begin{bmatrix} 11.07 \\ 6.37 \\ -2.52 \end{bmatrix}$$
  
$$b) \begin{bmatrix} 6.37 \\ -2.52 \\ -11.07 \end{bmatrix}$$
  
$$c) \begin{bmatrix} 6.37 \\ 2.52 \\ -11.07 \end{bmatrix}$$
  
$$d) \begin{bmatrix} 6.37 \\ -2.52 \\ 11.07 \end{bmatrix}$$

- ☐ a)  
☐ b)  
☒ c)  
☐ d)

5. Pls select the correct answer. \*

1 point

If Vector p0(2, 4, -1) is the results from rotation by rotation matrix equivalent to the ZX'Z'' Euler Angle (-150deg, -50deg, -90deg). Find the coordinate value p''(?, ?, ?).

$$a) \begin{bmatrix} 0.8178 \\ -3.7321 \\ -2.5304 \end{bmatrix}$$
  
$$b) \begin{bmatrix} 0.8178 \\ 3.7321 \\ -2.5304 \end{bmatrix}$$
  
$$c) \begin{bmatrix} 0.8178 \\ 3.7321 \\ 2.5304 \end{bmatrix}$$
  
$$d) \begin{bmatrix} -0.8178 \\ -3.7321 \\ 2.5304 \end{bmatrix}$$

- ☒ a)  
☐ b)  
☐ c)  
☐ d)

6. Pls select the correct answer. \*

1 point

From the given rotation matrix equivalent to the ZX'Z'' Euler Angle, Find rotated angle in Z(φ) X'(θ) Z''(ψ) when theta (θ)'s in quadrant 4.

$$R = R_z(\phi)R_x(\theta)R_z(\psi) = \begin{bmatrix} -0.3214 & -0.866 & -0.383 \\ 0.5567 & -0.5 & 0.6634 \\ -0.766 & 0 & 0.6428 \end{bmatrix}$$

- a) Z(φ) = -150 deg, X'(θ) = 50 deg, Z''(ψ) = -90 deg.  
b) Z(φ) = 30 deg, X'(θ) = -50 deg, Z''(ψ) = 90 deg.  
c) Z(φ) = -30 deg, X'(θ) = -50 deg, Z''(ψ) = 90 deg.  
d) Z(φ) = -30 deg, X'(θ) = -50 deg, Z''(ψ) = -90 deg.

$$\theta = \arctan2\left(-\frac{r_{12}}{r_{11}}, \frac{r_{13}}{r_{11}}\right) \quad \psi = \arctan2\left(\frac{r_{21}}{r_{11}}, \frac{r_{31}}{r_{11}}\right)$$
  
$$\phi = \arctan2\left(\frac{r_{22}}{r_{11}}, \frac{r_{32}}{r_{11}}\right)$$

- ☐ a)  
☒ b)  
☐ c)  
☐ d)

7. Pls select the correct answer. \*

1 point

Find the rotation matrix equivalent to the Roll-Pitch-Yaw angles (R<sub>x</sub>(ψ) 90deg, R<sub>y</sub>(θ) 200 deg, R<sub>z</sub>(φ) 30deg).

$$a) \begin{bmatrix} -0.8138 & -0.2962 & 0.5 \\ 0.4698 & -0.171 & 0.866 \\ 0.342 & -0.9397 & 0 \end{bmatrix}$$
  
$$b) \begin{bmatrix} -0.8138 & -0.2962 & 0.5 \\ -0.4698 & 0.171 & -0.866 \\ 0.342 & 0.9397 & 0 \end{bmatrix}$$
  
$$c) \begin{bmatrix} -0.8138 & -0.2962 & 0.5 \\ 0.4698 & -0.171 & 0.866 \\ -0.342 & -0.9397 & 0 \end{bmatrix}$$
  
$$d) \begin{bmatrix} -0.8138 & -0.2962 & 0.5 \\ -0.4698 & -0.171 & -0.866 \\ 0.342 & -0.9397 & 0 \end{bmatrix}$$

- ☐ a)  
☐ b)  
☐ c)  
☒ d)

8. Pls select the correct answer. \*

1 point

If Vector p''(5, 6, -7) is rotated by rotation matrix equivalent to the Roll-Pitch-Yaw angles (R<sub>x</sub>(ψ) 90 deg, R<sub>y</sub>(θ) 200 deg, R<sub>z</sub>(φ) 30 deg). Find the coordinate value p0(?, ?, ?).

$$a) \begin{bmatrix} -9.3462 \\ -2.6869 \\ -3.9281 \end{bmatrix}$$
  
$$b) \begin{bmatrix} 9.3462 \\ 2.6869 \\ -3.9281 \end{bmatrix}$$
  
$$c) \begin{bmatrix} -9.3462 \\ 2.6869 \\ -3.9281 \end{bmatrix}$$
  
$$d) \begin{bmatrix} -9.3462 \\ -2.6869 \\ 3.9281 \end{bmatrix}$$

- ☐ a)  
☐ b)  
☒ c)  
☐ d)

9. Pls select the correct answer. \*

1 point

From the given rotation matrix equivalent to the Roll-Pitch-Yaw angles, Find rotated angle in X(ψ) Y(θ) Z(φ) when theta (θ)'s in Quadrant 3.

$$R = R_x(\psi)R_y(\theta)R_z(\phi) = \begin{bmatrix} 0 & -0.866 & 0.5 \\ -0.766 & -0.3214 & -0.5567 \\ 0.6428 & -0.383 & -0.6634 \end{bmatrix}$$

- a) X(ψ) = 30 deg, Y(θ) = -140 deg, Z(φ) = 90 deg.  
b) X(ψ) = 30 deg, Y(θ) = -140 deg, Z(φ) = -90 deg.  
c) X(ψ) = 30 deg, Y(θ) = 220 deg, Z(φ) = 90 deg.  
d) a) and c) are correct.

$$\theta = \arctan2\left(\frac{r_{12}}{r_{11}}, \frac{r_{13}}{r_{11}}\right) \quad \psi = \arctan2\left(\frac{r_{21}}{r_{11}}, \frac{r_{31}}{r_{11}}\right)$$
  
$$\phi = \arctan2\left(\frac{r_{22}}{r_{11}}, \frac{r_{32}}{r_{11}}\right)$$

- ☐ a)  
☐ b)  
☐ c)  
☒ d)

10. Pls select the correct answer. \*

1 point

Find the unit quaternion that represents a rotation of 45° about (0, 0, k) and its inverse.

$$a) Q = (0.9238, 0, 0, 0.9238), Q^{-1} = (0.9238, 0, 0, -0.9238)$$
  
$$b) Q = (0.9238, 0, 0, -0.3827), Q^{-1} = (0.9238, 0, 0, 0.3827)$$
  
$$c) Q = (0.9238, 0, 0, 0.3827), Q^{-1} = (0.9238, 0, 0, -0.3827)$$
  
$$d) Q = (0.3827, 0, 0, 0.9238), Q^{-1} = (0.3827, 0, 0, -0.9238)$$

$$Q = \begin{bmatrix} q_0 \\ q_1 \\ q_2 \\ q_3 \end{bmatrix}$$
  
$$Q^{-1} = \begin{bmatrix} q_0 \\ -q_1 \\ -q_2 \\ -q_3 \end{bmatrix}$$

- ☐ a)  
☐ b)  
☒ c)  
☐ d)

11. Pls select the correct answer. \*

1 point

Find the unit quaternion that is equivalent to the following rotation matrix

$$R = \begin{bmatrix} 0 & -1 & 0 \\ 0.866 & 0 & -0.5 \\ 0.5 & 0 & 0.866 \end{bmatrix}$$

$$a) Q = (0.683, 0.183, -0.183, 0.683)$$
  
$$b) Q = (0.683, -0.183, 0.183, 0.683)$$
  
$$c) Q = (0.683, 0.183, -0.183, -0.683)$$
  
$$d) Q = (0.683, -0.183, -0.183, 0.683)$$

- ☒ a)  
☐ b)  
☐ c)  
☐ d)

12. Pls select the correct answer. \*

1 point

Find the rotation matrix that is equivalent to the following unit quaternion

The quaternion is Q = (0.9239, 0, 0, 0.3827), R = ?

$$a) \begin{bmatrix} 0.7072 & 0.7072 & 0 \\ 0.7072 & 0.7072 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$
  
$$b) \begin{bmatrix} 0.7072 & -0.7072 & 0 \\ -0.7072 & 0.7072 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$
  
$$c) \begin{bmatrix} 0.7072 & -0.7072 & 0 \\ 0.7072 & 0.7072 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$
  
$$d) \begin{bmatrix} 0.7072 & -0.7072 & 0 \\ -0.7072 & 0.7072 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

- ☐ a)  
☐ b)  
☒ c)  
☐ d)

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