

HW3.7. Find the velocity of a point on a body after a constant angular velocity is applied

Suppose that a body (frame 1) has original orientation with respect to a reference frame (frame 0)

$$R_{01} = \begin{bmatrix} 0.22 & -0.90 & -0.38 \\ 0.23 & 0.42 & -0.88 \\ 0.95 & 0.10 & 0.30 \end{bmatrix}$$

.

At $t = 0$, a point p on the body is located at

$$p^1 = \begin{bmatrix} -1.61 \\ -0.39 \\ -0.25 \end{bmatrix}$$

.

We rotate the body around the origin of frame 0 at a constant angular velocity

$$w = \begin{bmatrix} -1.96 \\ 1.67 \\ 2.75 \end{bmatrix}$$

.

for a duration of $t=7.75$ seconds.

What is the position and velocity of the point p in frame 0 at time t?

Python

```
import numpy as np

R01 = np.array([[0.218363598565,
-0.900791824488, -0.375355068910],
[0.230649928534, 0.421379937311,
-0.877063030175], [0.948218302549,
0.104943019618, 0.299781609416]])
```

Homework 3

Assessment
overview

Total 23/23
points:

Score: 80%

Question

Value: 2

History: 1
1
2
1
1

Awarded points: 5/5

Report an error in
this question

Previous
question

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Attached
files

No attached
files

Attach a file

Attach text

```
w0 = np.array([[−1.960000000000],  
[1.670000000000], [2.750000000000]])  
t = 7.750000000000  
p1 = np.array([[−1.610000000000],  
[−0.390000000000], [−0.250000000000]])
```

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$p^0 =$	matrix (rtol=0.01, atol=1e-08)	?
$v^0 =$	matrix (rtol=0.01, atol=1e-08)	?

Save & Grade
Single attempt

Save
only

Additional attempts available
with new variants

?