Attitude

1 $\hat{u} = 0.26726\hat{i} + 0.53452\hat{j} + 0.80178\hat{k}$

$\hat{v} = -0.44376\hat{i} + 0.80644\hat{j} - 0.38997\hat{k}$

$\hat{w} = -0.85536\hat{i} - 0.25154\hat{j} + 0.45284\hat{k}$

$V = -50\hat{i} + 100\hat{j} + 75\hat{k}$

Used matlab

$$\boxed{V' = 100.22\hat{u} + 73.62\hat{v} + 51.57\hat{w}}$$

2) find Q for 40° about x & 25° about y'

Wrote my own Matlab func

$$\begin{bmatrix} 0.9063 & 0.2717 & -0.3232 \\ 0 & 0.7660 & 0.6428 \\ 0.4226 & -0.5826 & 0.6943 \end{bmatrix}$$

3 Still matlab

a)

321: $\begin{bmatrix} 0.6710 & 0.4694 & -0.5736 \\ -0.2004 & 0.4597 & 0.4698 \\ 0.7139 & -0.2004 & 0.6710 \end{bmatrix}$

313: $\begin{bmatrix} 0.4015 & 0.4547 & 0.3290 \\ -0.8547 & 0.2207 & 0.4698 \\ 0.3290 & -0.4694 & 0.8192 \end{bmatrix}$

b)

321 rotation vector: [.6, .6, 1]

313 rotation vector: [.22, .22, 1]

c) These rotations are similar in that they both respectively have the same x and y components, and the z component is 1 for each as well. However, the x and y components vary between the two rotations.

4 Matlab (w/ rounding errors?)

$\theta = 116.78°$

5 Always matlab

$-20\hat{i} + 64\hat{j} + 0\hat{k}$

6 $\alpha_i = \frac{d\vec{w}^{0}}{dt} + \Omega \times w$

Matlab

$\alpha = [w_x w_z, \ -w_x w_z \quad 0]$

Attitude hw 1

Table of Contents

1

```
DCM = [ 0.26726, 0.53452, 0.80178;...
       -0.44376, 0.80684,-0.38997;...
       -0.85536,-0.25158, 0.45284];

u = [-50;100;75];

V = DCM*u
```

```
V =

  100.2225
   73.6243
   51.5730
```

2

```
findDCM(40,25,0,123)
```

```
Undefined function 'findDCM' for input arguments of type 'double'.

Error in Hw1 (line 14)
findDCM(40,25,0,123)
```

3

```
% a

a = findDCM(35,35,35,321)

b = findDCM(35,35,35,313)

% b
```

```
a1 = eig(a)
b1 = eig(b)
```

4

```
c = findDCM(50,25,70,313)
d = c*[1;0;0]

acosd(dot([1;0;0],d))
```

5

```
% a = dV/dt + omega x V
a = [12,0,0]+cross([0,0,8],[8,4,0])
```

6

```
syms x y z

cross([x,y,0],[x,y,z])
```

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