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Homework #1

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```
        Given a transformation matrix:

A_B_T = [  2^(-1/2) 0        2^(-1/2) 1 ;...
          -1/2     2^(-1/2)  1/2      2 ;...
          -1/2    -2^(-1/2)  1/2      3 ;...
           0       0         0        1  ];
```

```
Error using evalin
Undefined function or variable 'Homework1_RKD'.
```

1.

Shows that ${}^{B}_{A}\mathrm{R}_{3x3}$ is a rotation matrix Since its the three columns are orthogonal, then a consequence of this is that:

${}^{B}_{A}\mathrm{R}^{-1} = {}^{B}_{A}\mathrm{R}^{T}$ and $det({}^{B}_{A}\mathrm{R}) = 1$

```
A_B_R = t2r(A_B_T)
A_B_R*A_B_R'
det(A_B_R)
```

2.

3.

```
B_P = [ 4 5 6 1 ]';
A_P = A_B_T*B_P
```

4.

```
A_P_1 = [ 4 5 6 1 ]';
```

```
T = A_B_T;
A_P_2 = T*A_P_1
```

5.

```
B_A_T = inv(A_B_T)
```

6.

```
betha = atan2(-A_B_R(3,1),sqrt(A_B_R(1,1)^2+A_B_R(2,1)^2))
alpha = atan2( A_B_R(2,1)/cos(betha),A_B_R(1,1)/cos(betha))
gamma = atan2( A_B_R(3,2)/cos(betha),A_B_R(3,3)/cos(betha))
my_xyz_fangle = [gamma betha alpha]
xyz_fangle= tr2rpy(A_B_R)
R = rpy2r(xyz_fangle(1), xyz_fangle(2), xyz_fangle(3))
A_B_R

[theta, v] = tr2angvec(A_B_R)
```

7.

```
A_B_r1 = A_B_R(:,1)
A_B_r2 = A_B_R(:,2)
A_B_r3 = A_B_R(:,3)

norm(A_B_r1)
norm(A_B_r2)
norm(A_B_r3)

%[vectors,values] = eig(A_B_R)
[theta, v] = tr2angvec(A_B_R)
```

8.

```
gamma = tr2eul(A_B_R)
```

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