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```
% Chapter 2 Exercise 4
clc;
clear all
close all
```

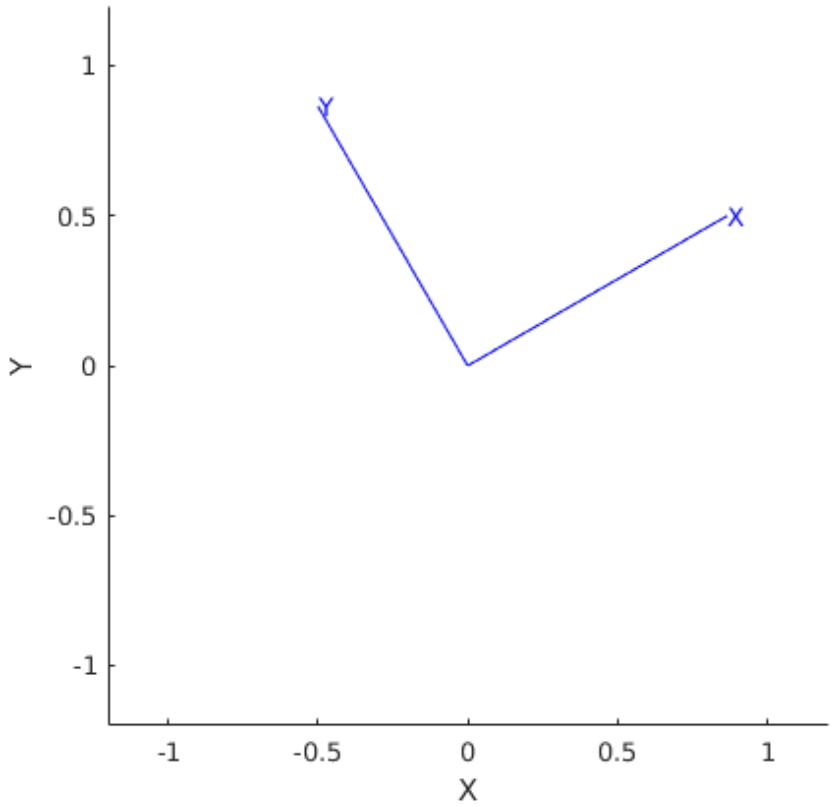
Create a 2D rotation matrix.

```
% angle to rotate by, theta
theta = pi/6;

% create the rotation matrix manually
disp 'rotation from frame 1 to frame 0:'
R_1_0 = [cos(theta) -sin(theta);
         sin(theta) cos(theta)]

 % create the same rotation matrix using the toolbox
 R = rot2(theta);

 % check if the rotations are equal
 if isequal(R_1_0,R)
     disp 'success!'
 else
     disp 'rotations not equivalent'
 end
```

```
rotation from frame 1 to frame 0:

R_1_0 =

    0.8660   -0.5000
    0.5000    0.8660

success!
```

Visualize the rotation using trplot2

```
 trplot2(R_1_0)
```



use the rotation to transform a vector

```
vec_in_frame_1 = [1 1]';
vec_in_frame_0 = R_1_0*vec_in_frame_1;
```

Invert the rotation and and then multiply by the original rotation

```
disp 'R_inv*R is:'
R_inv = inv(R_1_0);
result = R_inv*R_1_0
disp 'result is identity'
```

```
R_inv*R is:

result =

    1.0000   -0.0000
    0.0000    1.0000

result is identity
```

reverse the order and what is the result?

```
 disp 'R*R_inv is:'
 result = R_1_0*R_inv
 disp 'same result'
```

```
R*R_inv is:

result =

    1.0000   -0.0000
    0.0000    1.0000

same result
```

what is the determinant of the rotation and its inverse?

```
 disp 'det(R) and det(R_inv):'
 det_R = det(R)
 det_R_inv = det(R_inv)
```

```
det(R) and det(R_inv):

det_R =

     1


det_R_inv =

     1
```

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