Computer assignment - Linear Algebra

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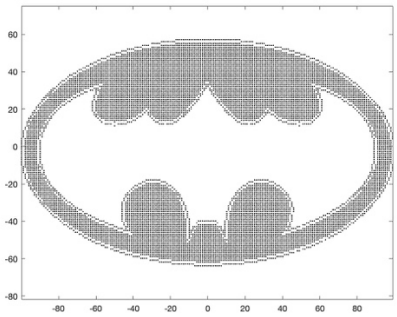
Imported code is marked in blue

Exercise 4.

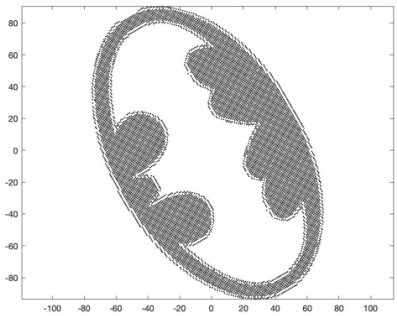
4a)

```
A = [1 0;0 -1];
C = A * B;
plot(C(1, :), C(2, :), 'k.','MarkerSize', 1)
axis equal
```



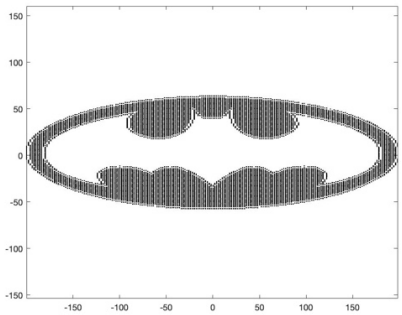
4b)

```
theta = 120*pi/180;
rot = [cos(theta) -sin(theta);sin(theta) cos(theta)];
E = rot * B;
plot(E(1, :), E(2, :), 'k.','MarkerSize', 1)
axis equal
```



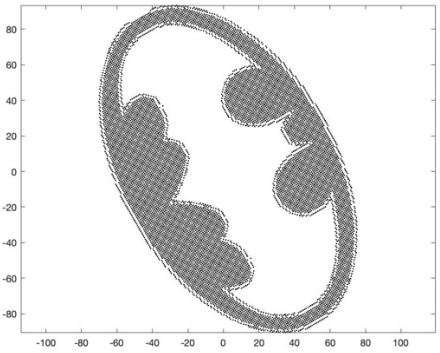
4c)

```
stretch = [2 0;0 1];
G = stretch * B;
plot(G(1, :), G(2, :), 'k.','MarkerSize', 1)
axis equal
```



4d)

```
theta = 60*pi/180;
rot = [cos(theta) -sin(theta);sin(theta) cos(theta)];
refl_y = [-1 0;0 1];
C = rot * B;
C = refl_y * C;
plot(C(1, :), C(2, :), 'k.','MarkerSize', 1)
axis equal
```



Exercise 5.

```
rng(7)
n = 30;
center = [0 0];
radius = 1;
eps = 0.1;
r = eps * rand (n ,1) + radius - eps /2;

As = [center(1)+r.*cos(2*pi*(1: n )'/n) center(2)+r.*sin(2* pi *(1:
n)'/n)];
b = As(:,1).^2 + As(:,2).^2;
plot(As(:,1), As(:,2), "b.");
hold on
A = As * 2;
A(:,3) = ones;
c = A\b;

radius = sqrt(c(3)+(c(1))^2+(c(2)^2));

th = 0:pi/100:2*pi;
xunit = radius * cos(th) + c(1);
yunit = radius * sin(th) + c(2);
plot(xunit,yunit);
hold off
axis equal

MSE = sum((radius^2-((As(:,1)-c(1)).^2) - ((As(:,2)-c(2)).^2)).^2)/30
```

C = (0,0050, -0,0021, 1,0035)

0.0050
-0.0021
1.0035