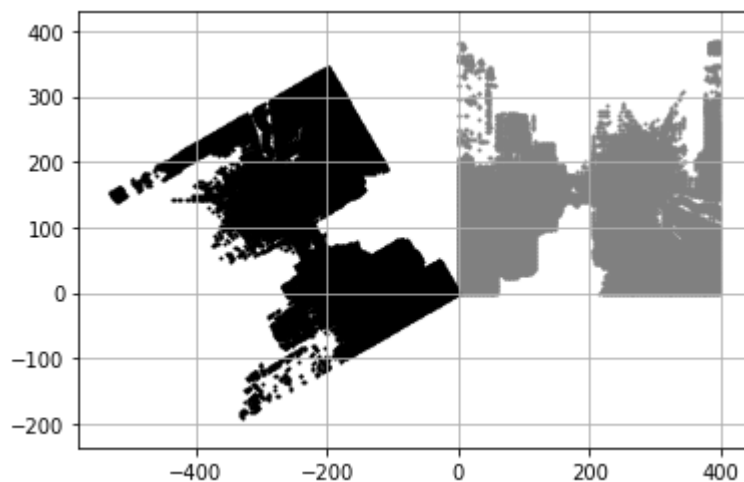


In [36]:

```
plt.scatter(imgnx.real,imgnx.imag, s=1, color="gray")  
plt.scatter(c_img.real,c_img.imag, s=1, color="black")  
plt.axis('equal')  
plt.grid(which='major')  
plt.show()
```



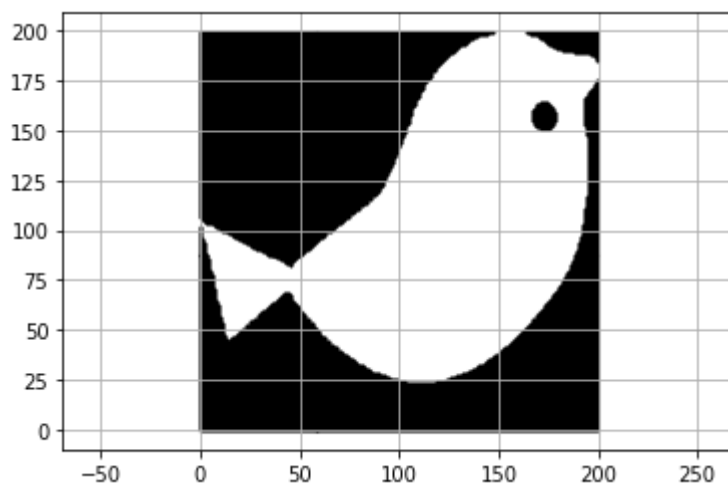
風景を動かしても面白くないかなあと思ったので・・・

In [42]:

```
filename = 'tori.png'  
img1 = imgfile2bin('piyo.png')
```

In [43]:

```
plt.scatter(img1.real,img1.imag, s=1, color="black")  
plt.axis('equal') # 実軸、虚軸を等間隔に  
plt.grid(which='major')  
plt.show()
```



In [44]:

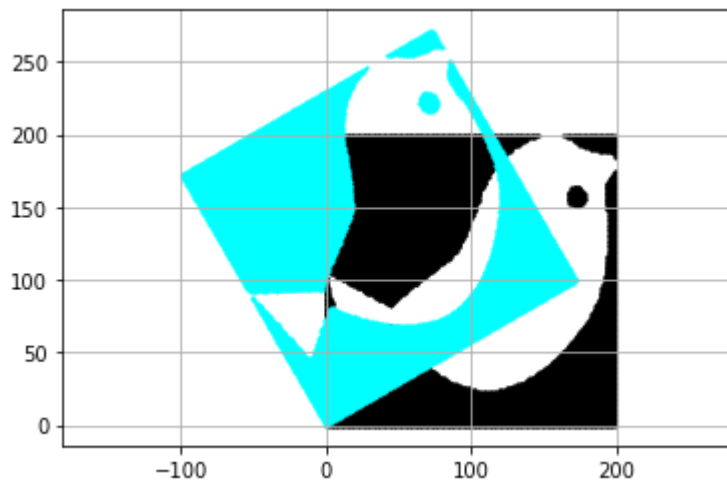
```
p_img=com2polar(img1)
p_img[:,1]=p_img[:,1]+30
c_img=polar2com(p_img)
c_img
```

Out[44]:

```
array([-99.5      +172.33905535j, -98.6339746 +172.83905535j,
       -97.76794919+173.33905535j, ..., 170.60700455 +98.5j      ,
        171.47302995 +99.j      , 172.33905535 +99.5j      ])
```

In [45]:

```
plt.scatter(img1.real,img1.imag, s=1, color="black")
plt.scatter(c_img.real,c_img.imag, s=1, color="aqua")
plt.axis('equal')
plt.grid(which='major')
plt.show()
```



In [46]:

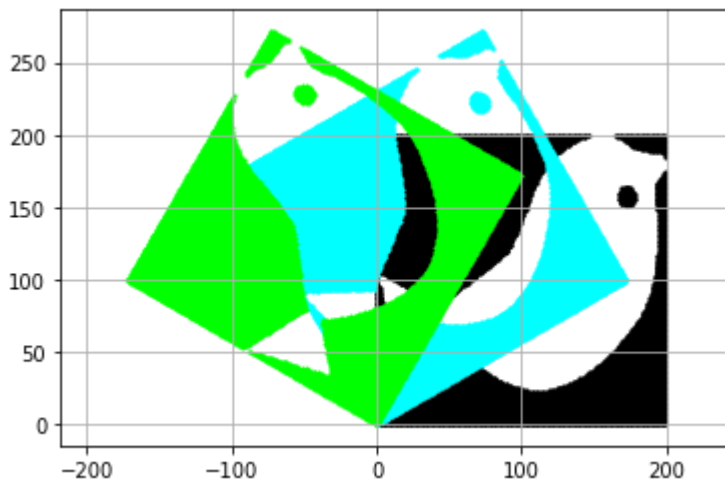
```
p_img=com2polar(img1)
p_img[:,1]=p_img[:,1]+60
v_img=polar2com(p_img)
v_img
```

Out[46]:

```
array([-172.33905535 +99.5j      , -171.83905535+100.3660254j ,
       -171.33905535+101.23205081j, ...,  98.5      +170.60700455j,
        99.      +171.47302995j, 99.5      +172.33905535j])
```

In [47]:

```
plt.scatter(img1.real,img1.imag, s=1, color="black")
plt.scatter(c_img.real,c_img.imag, s=1, color="aqua")
plt.scatter(v_img.real,v_img.imag, s=1, color="lime")
plt.axis('equal')
plt.grid(which='major')
plt.show()
```



In [48]:

```
p_img=com2polar(img1)
p_img[:,1]=p_img[:,1]+90
z_img=polar2com(p_img)
z_img
```

Out[48]:

```
array([-1.99000000e+02+2.43704713e-14j, -1.99000000e+02+1.00000000e+00j,
       0j,
       -1.99000000e+02+2.00000000e+00j, ...,
       1.20627710e-14+1.97000000e+02j, 1.21240033e-14+1.98000000e+02j,
       1.21852357e-14+1.99000000e+02j])
```

In [49]:

```
p_img=com2polar(img1)
p_img[:,1]=p_img[:,1]+120
x_img=polar2com(p_img)
x_img
```

Out[49]:

```
array([-172.33905535 -99.5j, -172.83905535 -98.6339746j,
       -173.33905535 -97.76794919j, ..., -98.5 +170.60700455j,
       -99. +171.47302995j, -99.5 +172.33905535j])
```

In [50]:

```
p_img=com2polar(img1)
p_img[:,1]=p_img[:,1]+150
b_img=polar2com(p_img)
b_img
```

Out[50]:

```
array([-99.5      -172.33905535j, -100.3660254 -171.83905535j,
       -101.23205081-171.33905535j, ..., -170.60700455 +98.5j      ,
       -171.47302995 +99.j        , -172.33905535 +99.5j      ])
```

In [51]:

```
p_img=com2polar(img1)
p_img[:,1]=p_img[:,1]+180
n_img=polar2com(p_img)
n_img
```

Out[51]:

```
array([-3.6555707e-14-1.99000000e+02j, -1.0000000e+00-1.99000000e+02j,
       -2.0000000e+00-1.99000000e+02j, ...,
       -1.9700000e+02+2.41255419e-14j, -1.9800000e+02+2.42480066e-14j,
       -1.9900000e+02+2.43704713e-14j])
```

In [52]:

```
p_img=com2polar(img1)
p_img[:,1]=p_img[:,1]+210
m_img=polar2com(p_img)
m_img
```

Out[52]:

```
array([ 99.5      -172.33905535j,  98.6339746 -172.83905535j,
       97.76794919-173.33905535j, ..., -170.60700455 -98.5j      ,
       -171.47302995 -99.j        , -172.33905535 -99.5j      ])
```

In [53]:

```
p_img=com2polar(img1)
p_img[:,1]=p_img[:,1]+240
a_img=polar2com(p_img)
a_img
```

Out[53]:

```
array([172.33905535 -99.5j      , 171.83905535-100.3660254j ,
       171.33905535-101.23205081j, ..., -98.5      -170.60700455j,
       -99.      -171.47302995j, -99.5      -172.33905535j])
```

In [54]:

```
p_img=com2polar(img1)
p_img[:,1]=p_img[:,1]+270
s_img=polar2com(p_img)
s_img
```

Out[54]:

```
array([ 1.99000000e+02-4.87409426e-14j,  1.99000000e+02-1.00000000e+00j,
        1.99000000e+02-2.00000000e+00j, ...,
        -3.61883129e-14-1.97000000e+02j, -3.63720099e-14-1.98000000e+02j,
        -3.65557070e-14-1.99000000e+02j])
```

In [55]:

```
p_img=com2polar(img1)
p_img[:,1]=p_img[:,1]+300
d_img=polar2com(p_img)
d_img
```

Out[55]:

```
array([172.33905535 +99.5j, 172.83905535 +98.6339746j,
        173.33905535 +97.76794919j, ..., 98.5 -170.60700455j,
        99. -171.47302995j, 99.5 -172.33905535j])
```

In [56]:

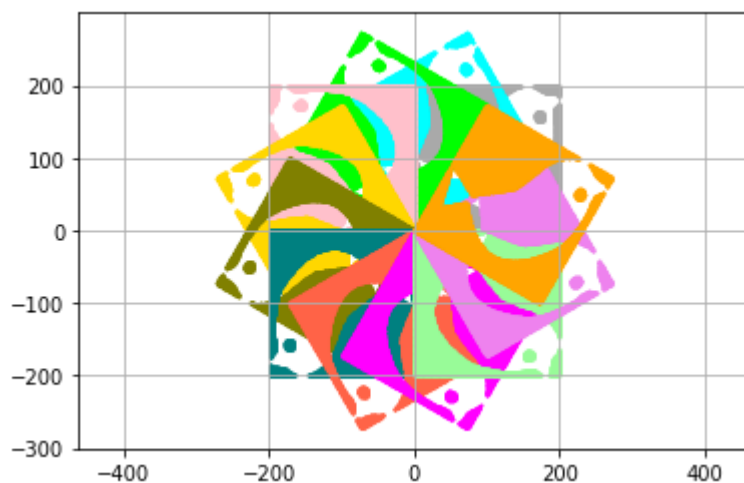
```
p_img=com2polar(img1)
p_img[:,1]=p_img[:,1]+330
f_img=polar2com(p_img)
f_img
```

Out[56]:

```
array([ 99.5 +172.33905535j, 100.3660254 +171.83905535j,
        101.23205081+171.33905535j, ..., 170.60700455 -98.5j,
        171.47302995 -99.j, 172.33905535 -99.5j])
```

In [57]:

```
plt.scatter(img1.real,img1.imag, s=1, color="darkgray")
plt.scatter(c_img.real,c_img.imag, s=1, color="aqua")
plt.scatter(v_img.real,v_img.imag, s=1, color="lime")
plt.scatter(z_img.real,z_img.imag, s=1, color="pink")
plt.scatter(x_img.real,x_img.imag, s=1, color="gold")
plt.scatter(b_img.real,b_img.imag, s=1, color="olive")
plt.scatter(n_img.real,n_img.imag, s=1, color="teal")
plt.scatter(m_img.real,m_img.imag, s=1, color="tomato")
plt.scatter(a_img.real,a_img.imag, s=1, color="fuchsia")
plt.scatter(s_img.real,s_img.imag, s=1, color="palegreen")
plt.scatter(d_img.real,d_img.imag, s=1, color="violet")
plt.scatter(f_img.real,f_img.imag, s=1, color="orange")
plt.axis('equal')
plt.grid(which='major')
plt.show()
```



In []: