

leeyh1011 / -linear-algebra-2 Public

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-linear-algebra-2 / 수몽이_실습_202210957이윤호.ipynb



leeyh1011 now



451 lines (451 loc) · 974 KB

Preview

Code

Blame



[Open in Colab](#)

```
In [54]: import numpy as np
import numpy.linalg as npl
import matplotlib.pyplot as plt
import PIL
from PIL import Image
```

```
In [52]: plt.rcParams["figure.figsize"] = (10,10)
origin2D = np.array([0,0])
origin3D = np.array([0,0,0])
scale = 10
```

(행)벡터, 열벡터

```
In [26]: print(np.array([1,0]))
print(np.hstack([1,0]))
print(np.vstack([1,0]))
```

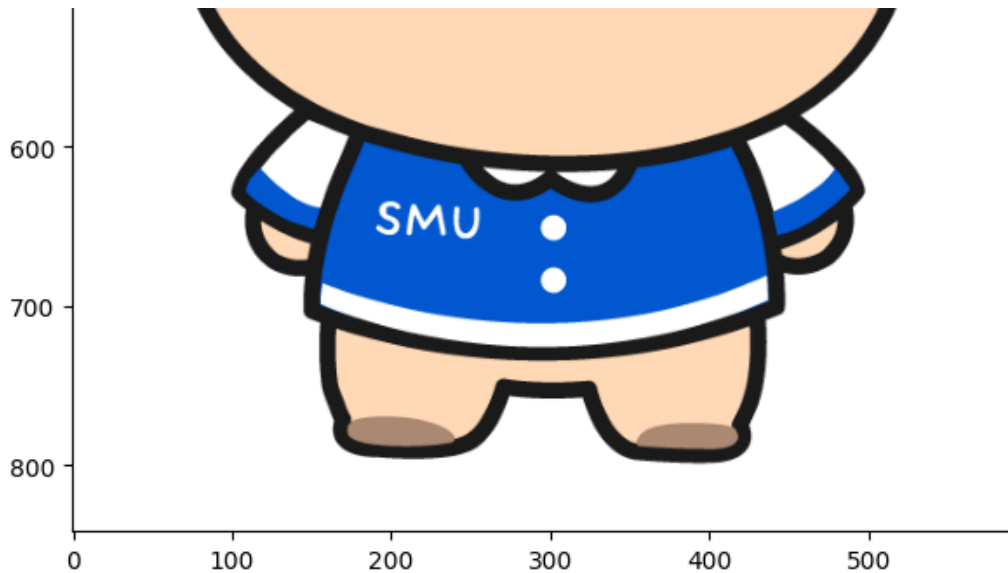
```
[1 0]
[1 0]
[[1]
 [0]]
```

```
In [45]: smung = Image.open('smung.png')
print(smung)
print(smung.format)
print(smung.size)
print(smung.mode)

plt.imshow(smung)
plt.show()
```

```
<PIL.PngImagePlugin.PngImageFile image mode=RGBA size=595x842 at 0x7F936B626AD0>
PNG
(595, 842)
RGBA
```





```
In [46]: imMatrix = np.array(smung.convert("L"))/255.0
         print( imMatrix.shape )
         print( imMatrix )
```

```
(842, 595)
[[0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 ...
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]
 [0. 0. 0. ... 0. 0. 0.]]
```

```
In [95]: scalar = 1/2
         shape = np.shape(imMatrix)
         U, S, V = npl.svd(imMatrix)

         Sd = np.vstack([np.eye(shape[1])*S.copy(), np.zeros((shape[0]-shape[1], shape[1]))])
         print(np. shape(U), np.shape(Sd), np.shape(V))
```

```
(842, 842) (842, 595) (595, 595)
```

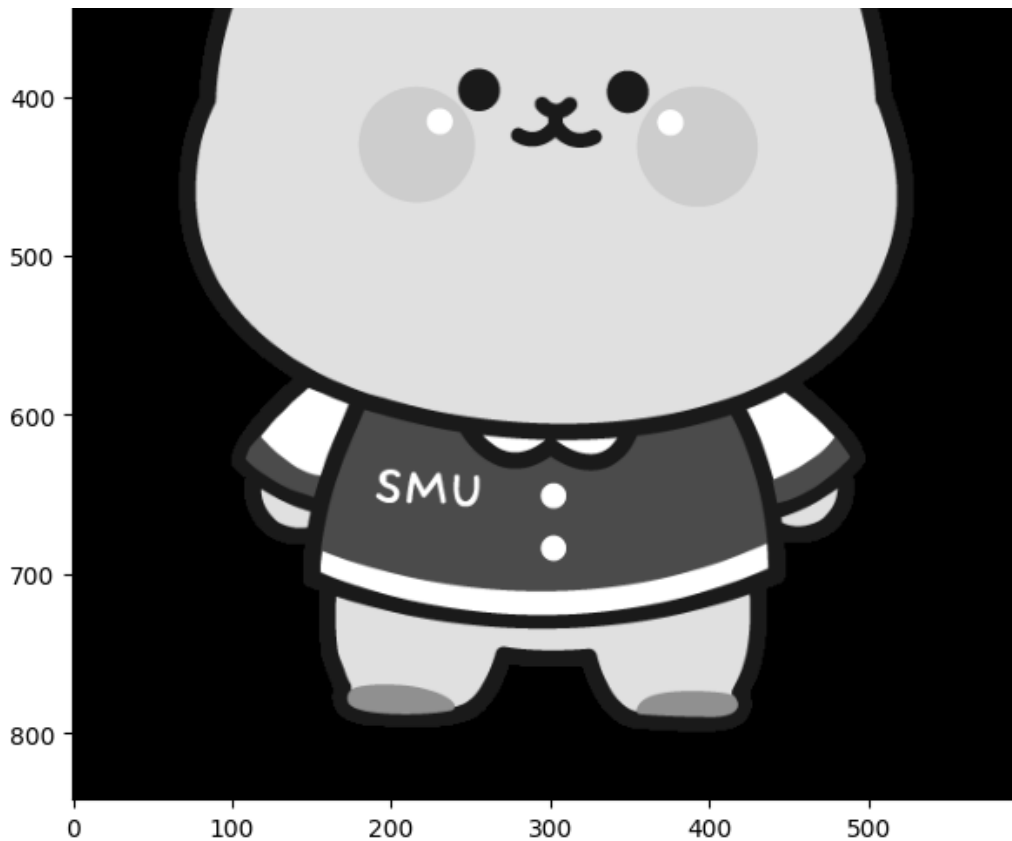
```
In [96]: usv = U @ Sd @ V

         print( np.allclose(imMatrix, usv))

         plt.imshow(usv, cmap='gray')
         plt.show()
```

```
True
```



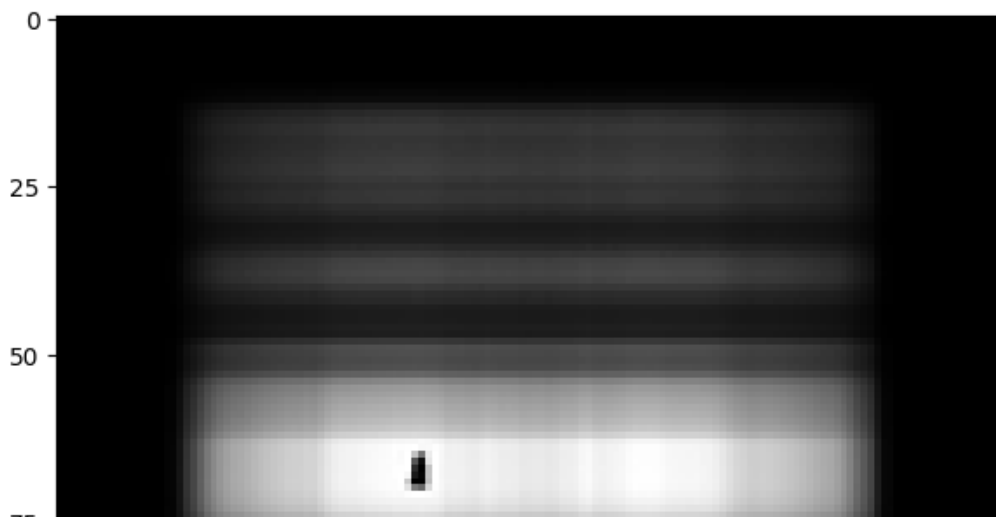


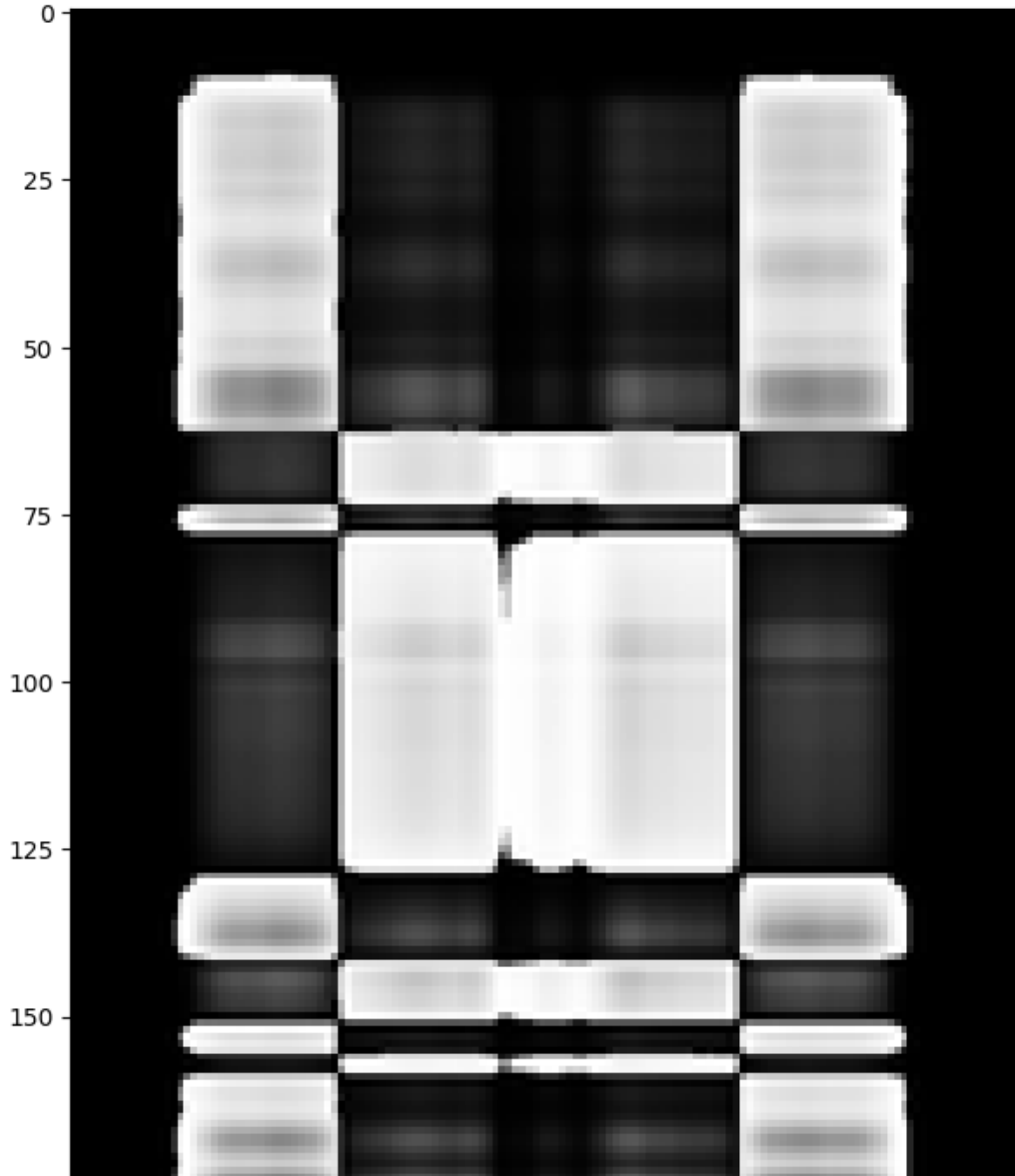
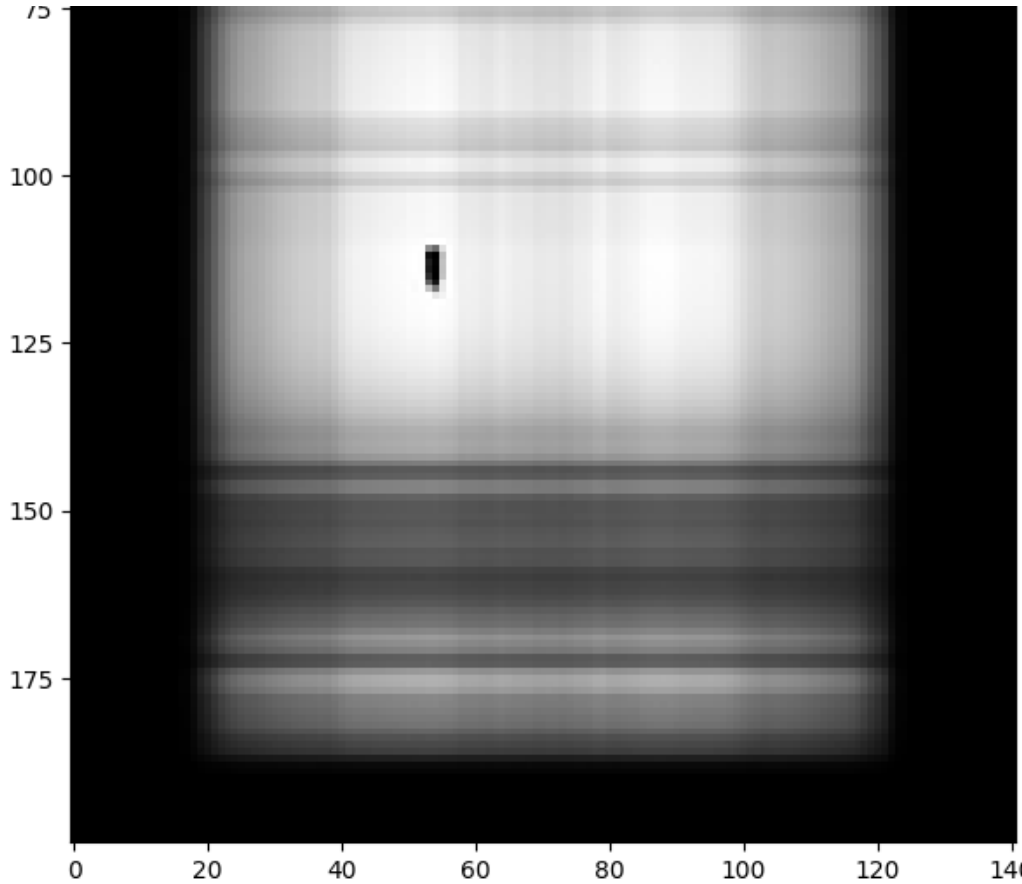
```
In [97]: k = 1
print(np. shape(U[:, :k]))
print(np. shape(np.diag(S[:k])))
print(np. shape(V.T[:, :k].T))

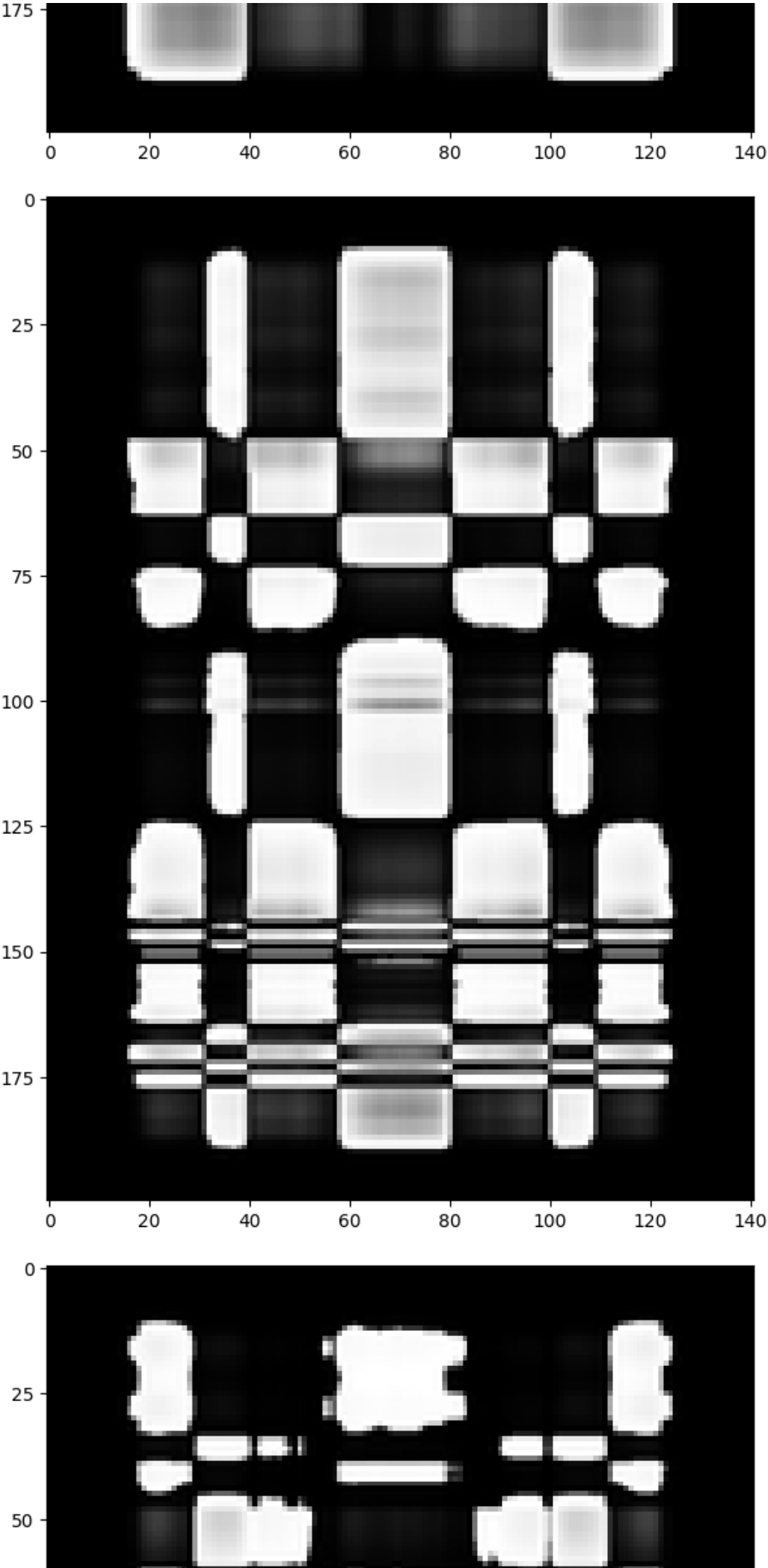
m,n = np.shape(imMatrix)
partial, total = k*(m+n)+k, m*n
print(np.ndim(imMatrix),[np.shape(i) for i in [imMatrix,U,Sd,V]])
print(partial,total,partial/total)

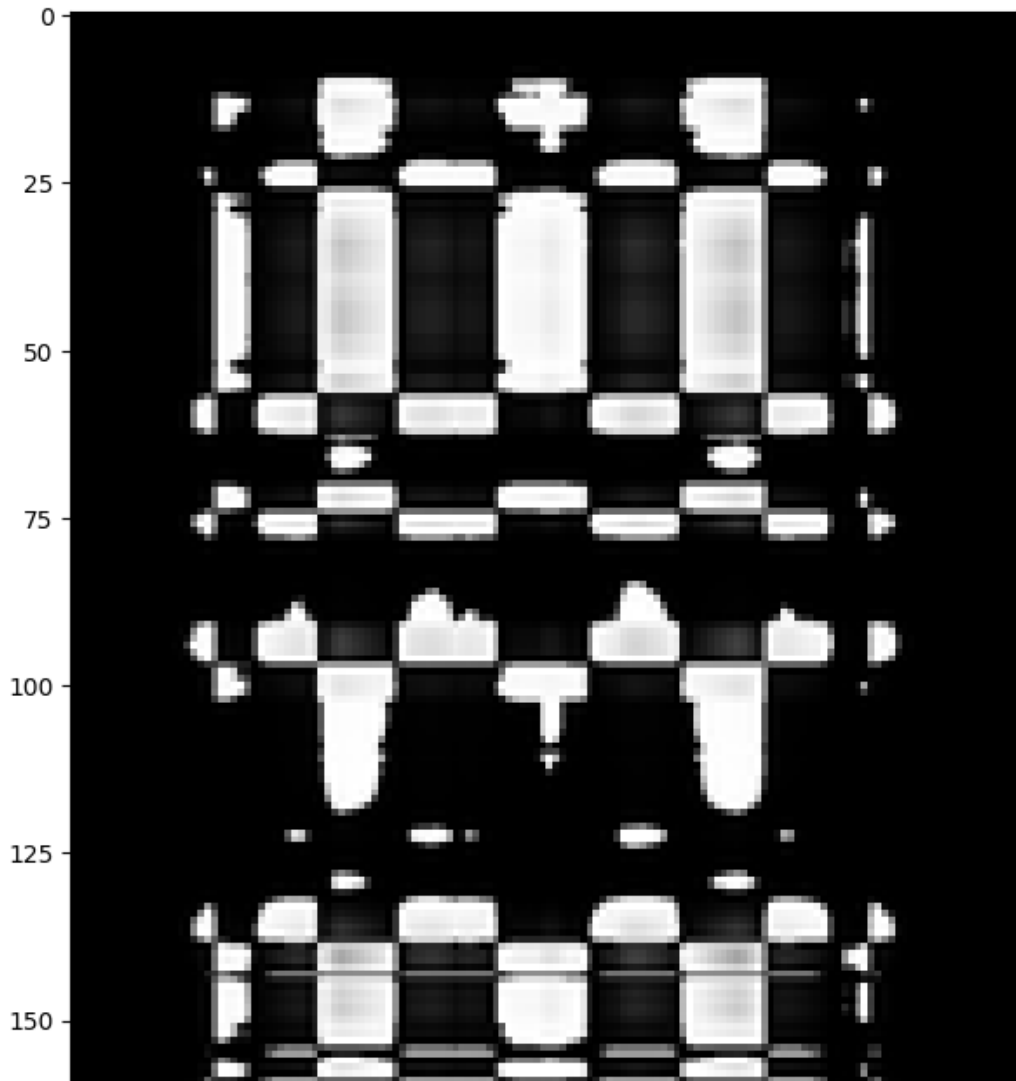
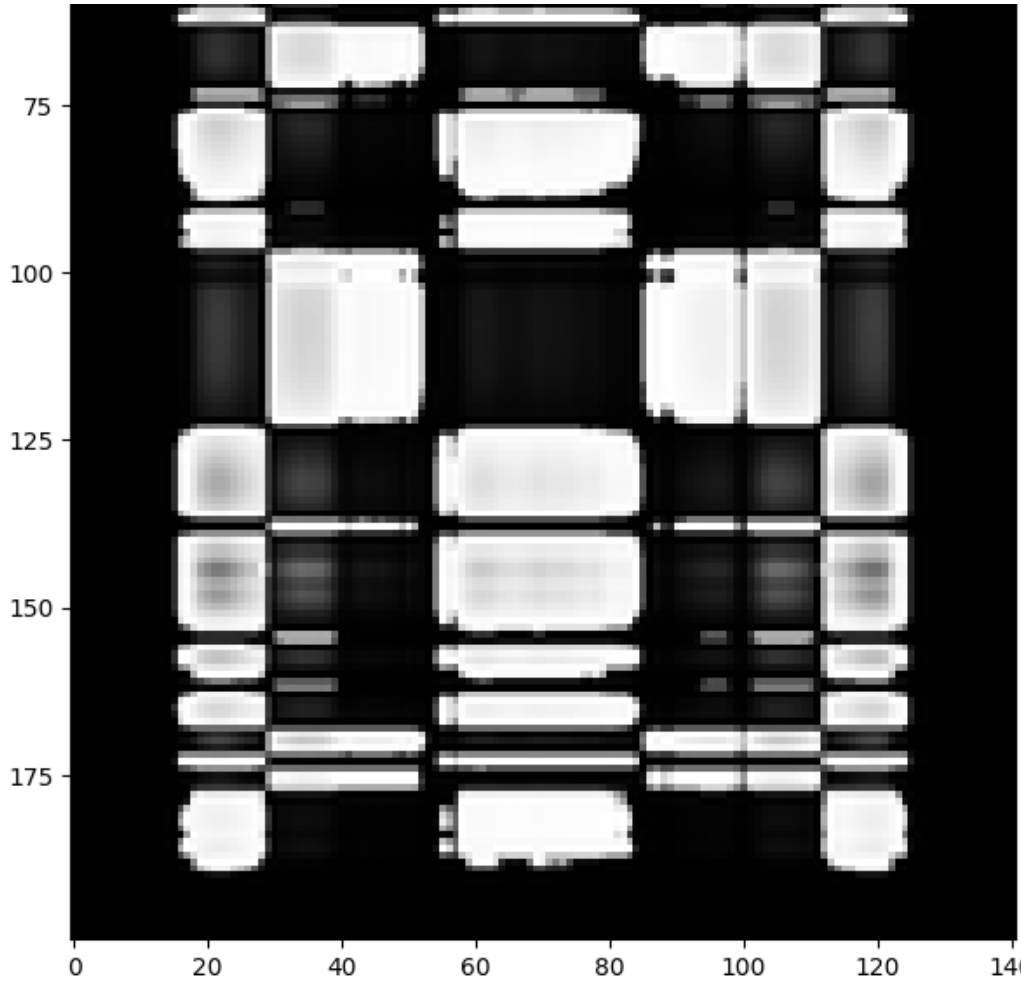
size = (200,200)
imtemp = lambda k: (np.vstack(U[:,k-1])@np.vstack([S[k-1]])@np.vstack(V[k-1])).T*255
for i in list(range(1,6)):
    im = Image.fromarray(imtemp(i).astype('uint8'))
    im.thumbnail(size, Image.ANTIALIAS)
    plt.imshow(im, cmap='gray')
    plt.show()
```

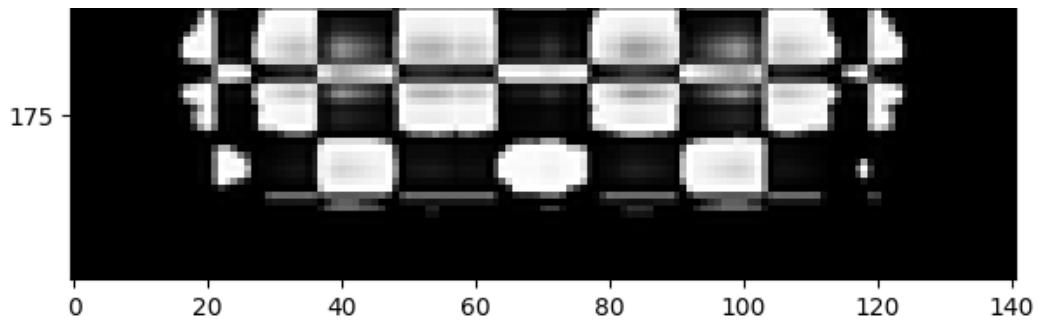
```
(842, 1)
(1, 1)
(1, 595)
2 [(842, 595), (842, 842), (842, 595), (595, 595)]
1438 500990 0.002870316772789876
```











```
In [98]: quality = 5
np. shape(U[:, :quality])
np. shape(np.diag(S[:quality]))
np. shape(V[:quality, :])
k = quality

m,n = np.shape(imMatrix)
partial, total = k*(m+n)+k, m*n
np.ndim(imMatrix), [np.shape(i) for i in [imMatrix,U,Sd,V]]
partial,total,partial/total

imtemp = lambda k: (U[:, :k]@np.diag(S[:k]))@V.T[:, :k].T)*255
for i in list(range(1,6)):
    im = Image.fromarray(imtemp(i).astype('uint8'))
    im.thumbnail(size, Image.ANTIALIAS)
    plt.imshow(im, cmap='gray')
    plt.show()
```

