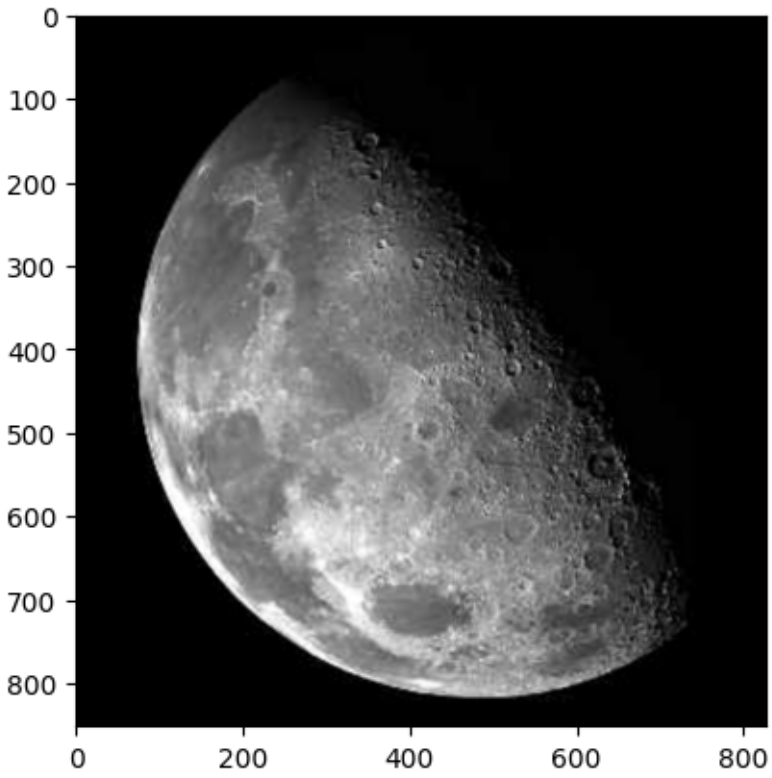
ex4

September 18, 2024

[5]:
```
import numpy as np
import matplotlib.pyplot as plt
from PIL import Image
from scipy.signal import convolve2d
```

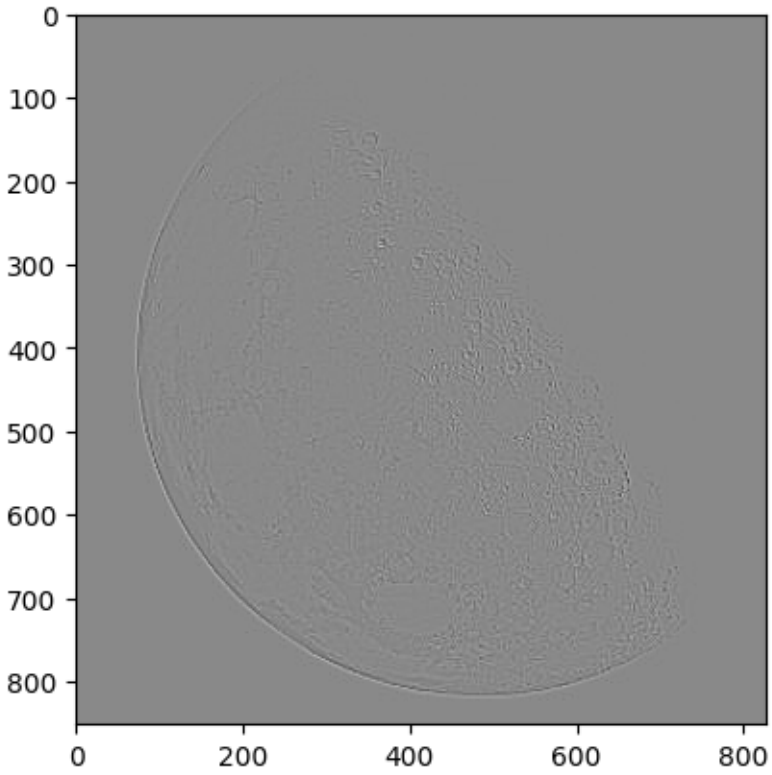
[6]:
```
f = np.array(Image.open('./assets/moon.png').convert('L'))

# Plot the image
plt.imshow(f, cmap='gray')
plt.show()
```



[16]:
```
kernel = np.ones((3,3))
kernel[1,1] = -8
# 1  1 1
# 1 -8 1
# 1  1 1
laplacian = convolve2d(f, kernel, mode='same')

# Plot the image
plt.imshow(laplacian, cmap='gray')
plt.show()
```



[27]:
```
kernel = -np.ones((3,3))
kernel[1,1] = 9
# -1 -1 -1
# -1  9 -1
# -1 -1 -1
laplacian_fondo = convolve2d(f, kernel, mode='same')
```

[28]:
```
plt.figure(figsize=(18,8))
ax = plt.subplot(1,4,1)
ax.imshow(f, cmap='gray', vmin=0, vmax=255)
ax.axis('off')
```

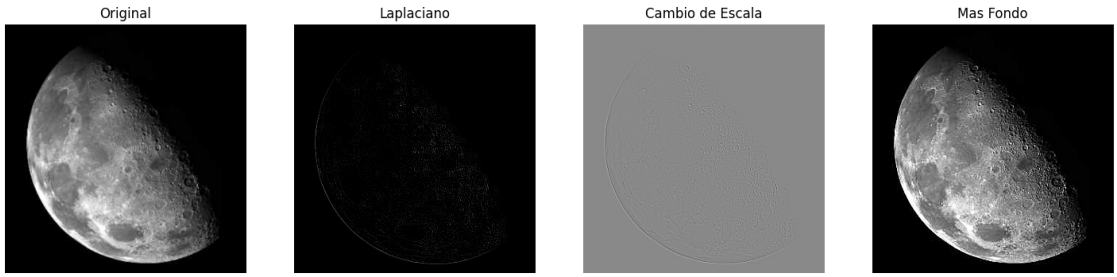
```
ax.set_title('Original')

ax = plt.subplot(1,4,2)
ax.imshow(laplacian, cmap='gray', vmin=0, vmax=255)
ax.set_title(f'Laplaciano')
ax.axis('off')

ax = plt.subplot(1,4,3)
ax.imshow(laplacian, cmap='gray')
ax.set_title(f'Cambio de Escala')
ax.axis('off')

ax = plt.subplot(1,4,4)
ax.imshow(laplacian_fondo, cmap='gray', vmin=0, vmax=255)
ax.set_title(f'Mas Fondo')
ax.axis('off')

plt.show()
```



[29]:
```
plt.figure(figsize=(12,8))
ax = plt.subplot(1,2,1)
ax.imshow(f, cmap='gray', vmin=0, vmax=255)
ax.axis('off')
ax.set_title('Original')

ax = plt.subplot(1,2,2)
ax.imshow(laplacian_fondo, cmap='gray', vmin=0, vmax=255)
ax.set_title(f'Laplaciano + Fondo')
ax.axis('off')

plt.show()
```

Original

Laplaciano + Fondo