11. Matrix inverses

11.1. Left and right inverses

We'll see later how to find a left or right inverse, when one exists.

In [ ]:
```
A = np.array([[-3,-4], [4,6], [1,1]])
B = np.array([[-11,-10,16], [7,8,-11]])/9 #left inverse of A
C = np.array([[0,-1,6], [0,1,-4]])/2 #Another left inverse of A
#Let's check
B @ A
```

Out[ ]:
```
array([[ 1.0000000e+00,  0.0000000e+00],
       [-4.4408921e-16,  1.0000000e+00]])
```

In [ ]:
```
C @ A
```

Out[ ]:
```
array([[1., 0.],
       [0., 1.]])
```

11.2. Inverse

If `A` is invertible, its inverse is given by `np.linalg.inv(A)`. You'll get an error if `A` is not invertible, or not square.

In [ ]:
```
A = np.array([[1,-2,3], [0,2,2], [-4,-4, -4]])
B = np.linalg.inv(A)
B
```

Out[ ]:
```
array([[-2.77555756e-17, -5.00000000e-01, -2.50000000e-01],
       [-2.00000000e-01,  2.00000000e-01, -5.00000000e-02],
       [ 2.00000000e-01,  3.00000000e-01,  5.00000000e-02]])
```

In [ ]:
```
B @ A
```