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In [20]:

```
import numpy as np
m = np.array([[1,2,3],[4,5,6],[7,8,9]])
v = np.array([[10,11,12],[20,21,22],[30,31,32]])
print(m.transpose())

inverse = np.linalg.inv(m)
print('\ninverse of Matrix is:\n\n',inverse)

square = m**2
print("\n\nSquare of Matrix is:\n\n",square)

print("\n\nATB is:\n\n",(m.T)*v)

print("\n\nATB inverse is:\n\n",np.linalg.inv((m.T)*v))

print("\n\nBBT inverse is:\n\n",np.linalg.inv(v*(v.T)))

```

```
[[1 4 7]
 [2 5 8]
 [3 6 9]]

inverse of Matrix is:

 [[ 3.15251974e+15 -6.30503948e+15  3.15251974e+15]
 [-6.30503948e+15  1.26100790e+16 -6.30503948e+15]
 [ 3.15251974e+15 -6.30503948e+15  3.15251974e+15]]


Square of Matrix is:

 [[ 1  4  9]
 [16 25 36]
 [49 64 81]]


ATB is:

 [[ 10  44  84]
 [ 40 105 176]
 [ 90 186 288]]


ATB inverse is:

 [[ 0.67096774 -0.79354839  0.28924731]
 [-1.16129032  1.25806452 -0.43010753]
 [ 0.54032258 -0.56451613  0.19086022]]


BBT inverse is:

 [[ 0.33514851 -0.5009901   0.21584158]
 [-0.5009901   0.67326733 -0.27227723]
 [ 0.21584158 -0.27227723  0.10643564]]
```

In [51]:

```
import numpy as np
a = np.array([[2//3,1//3,2//3],[-(2//3),2//3,1//3],[1//3,2//3,-2//3]])
i = np.identity(3,dtype = int)
print(a)
#print("B:\n",i)
if (a*a.T).all() == i.all():
    print("This Matrix is Orthogonal!!!")
else:
    print("This matrix is Not Orthogonal")
```

```
[[ 0  0  0]
 [ 0  0  0]
 [ 0  0 -1]]
This Matrix is Orthogonal!!!
```