f-27-jupyter-at-a-problem

May 11, 2021

[1]:
```
import numpy as np
```

[2]:
```
s = 1e-9
a = np.array([[1.0, 1.0],
              [  s,   0],
              [  0,   s]])
```

[3]:
```
a
```

[3]:
```
array([[1.e+00, 1.e+00],
       [1.e-09, 0.e+00],
       [0.e+00, 1.e-09]])
```

[4]:
```
a.T @ a
```

[4]:
```
array([[1., 1.],
       [1., 1.]])
```

[5]:
```
(a.T @ a)[1,0]
```

[5]:
```
1.0
```

[6]:
```
np.all(a.T @ a == np.ones((a.T @ a).shape))
```

[6]:
```
True
```

[7]:
```
v0 = np.array([1.0, 1.0])[:, np.newaxis]
v1 = np.array([1.0, -1.0])[:, np.newaxis]
```

[8]:
```
(a.T @ a) @ v0
```

[8]:
```
array([[2.],
       [2.]])
```

[9]:
```
(a.T @ a) @ v1
```

[9]:
```
array([[0.],
       [0.]])
```

[10]:
```
np.linalg.svd(a, compute_uv=False)
```

[10]:
```
array([1.41421356e+00, 1.00000000e-09])
```

[11]:
```
1.0 + s**2
```

[11]:
```
1.0
```

[12]:
```
a @ a.T
```

[12]:
```
array([[2.e+00, 1.e-09, 1.e-09],
       [1.e-09, 1.e-18, 0.e+00],
       [1.e-09, 0.e+00, 1.e-18]])
```

[13]:
```
np.linalg.eigvals(a @ a.T)
```

[13]:
```
array([ 2.00000000e+00, -1.92592994e-34,  1.00000000e-18])
```

[ ]:
```

```