f-16-jupyter-mindst

March 25, 2021

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

```
[2]: a = np.array([[1.0, 1.0],
                   [1.0, 2.0],
                   [0.0, 1.0]])
     a
```

```
[2]: array([[1., 1.],
            [1., 2.],
            [0., 1.]])
```

```
[3]: b = np.array([1.0, 2.0, 0.0])[:, np.newaxis]
     b
```

```
[3]: array([[1.],
            [2.],
            [0.]])
```

```
[4]: xy = np.array([1.0, 1/3.0])[:, np.newaxis]
     xy
```

```
[4]: array([[1.        ],
            [0.33333333]])
```

```
[5]: a @ xy
```

```
[5]: array([[1.33333333],
            [1.66666667],
            [0.33333333]])
```

```
[6]: b - a @ xy
```

```
[6]: array([[-0.33333333],
            [ 0.33333333],
            [-0.33333333]])
```

```
[7]: np.linalg.norm(b - a @ xy)
```

```
[7]: 0.5773502691896258
```

```
[8]: rng = np.random.default_rng()
```

```
[11]: for i in range(10):
          random_xy = rng.standard_normal((2, 1))
          print(np.linalg.norm(b - a @ random_xy))
```

```
5.811949973861189
5.766528176686904
2.4579682165398222
2.420609896361185
1.0213743916738287
0.801194902875232
0.8225616000042665
2.3158605345547283
2.0109258661890057
1.2867018006264705
```

```
[13]: m = 10.0
      for i in range(1000):
          random_xy = rng.standard_normal((2, 1))
          norm = np.linalg.norm(b - a @ random_xy)
          if norm < m:
              m = norm

      print(m)
```

```
0.580007620985934
```

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[ ]:
```