Source task and conventions

Apply a norm routine to a tensor of at least three axes and identify the quantity computed.

Conventional solution and proof

The answer depends on the named routine and its parameters. The executed example uses NumPy with no explicit order or axis:

```
X = np.arange(24., dtype=np.float64).reshape(2, 3, 4)
v = np.linalg.norm(X)
```

It returns the Euclidean norm of the flattened array,

$$v = \left(\sum_{i,j,k} |X_{ijk}|^2 \right)^{1/2} = \sqrt{\sum_{r=0}^{23} r^2} = \sqrt{4324}.$$

NumPy's documented default with both `ord=None` and `axis=None` is this flattened norm. An explicitly specified matrix spectral or nuclear norm has a different input contract. The corresponding PyTorch `linalg.vector_norm` also flattens by default. The local version and the numerical output are recorded with the tests.

Structural or analytic derivation