

Properties of inner products

LATEST SUBMISSION GRADE

100%

1.Question 1

The function

$$\beta(\mathbf{x}, \mathbf{y}) = \mathbf{x}^T \begin{bmatrix} 2 & -1 \\ -1 & 1 \end{bmatrix} \mathbf{y}$$

is

1 / 1 point

- ☒ symmetric
- ☒ bilinear
- ☐ not an inner product
- ☐ not symmetric
- ☒ an inner product
- ☒ positive definite
- ☐ not bilinear
- ☐ not positive definite

2.Question 2

The function

$$\beta(\mathbf{x}, \mathbf{y}) = \mathbf{x}^T \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix} \mathbf{y}$$

is

1 / 1 point

- ☐ not symmetric
- ☐ not bilinear
- ☐ an inner product

- ☒ symmetric
- ☒ bilinear
- ☐ positive definite
- ☒ not an inner product
- ☒ not positive definite

3.Question 3

The function

$$\beta(\mathbf{x}, \mathbf{y}) = \mathbf{x}^T \begin{bmatrix} 2 & -1 \\ 1 & 1 \end{bmatrix} \mathbf{y}$$

is

1 / 1 point

- ☐ symmetric
- ☒ not symmetric
- ☒ bilinear
- ☐ not bilinear
- ☐ an inner product
- ☒ not an inner product

4.Question 4

The function

$$\beta(\mathbf{x}, \mathbf{y}) = \mathbf{x}^T \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \mathbf{y}$$

is

1 / 1 point

- ☒ bilinear
- ☒ symmetric
- ☐ not bilinear

- ☒ an inner product
- ☐ not an inner product
- ☐ not positive definite
- ☐ not symmetric
- ☒ positive definite

5.Question 5

For any two vectors $x,y \in \mathbb{R}^2$ write a short piece of code that defines a valid inner product.

1 / 1 point

```
import numpy as np

def dot(a, b):
    """Compute dot product between a and b.

    Args:
        a, b: (2,) ndarray as  $\mathbb{R}^2$  vectors

    Returns:
        a number which is the dot product between a, b
    """

    dot_product = np.dot(a, b)

    return dot_product

# Test your code before you submit.

a = np.array([1,0])
b = np.array([0,1])
print(dot(a,b))
```

RunReset

0