General inner products: lengths and distances

4/5 points (80.00%)

Practice Quiz, 5 questions

Congratulations! You passed!

Next Item

1 / 1 points

1.
Compute the length of

$$\mathbf{x} = \begin{bmatrix} 1 \\ -1 \\ 3 \end{bmatrix}$$

using the inner product defined

$$\langle \mathbf{a}, \mathbf{b} \rangle = \mathbf{a}^T \begin{bmatrix} 2 & 1 & 0 \\ 1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix} \mathbf{b}$$

Do the exercise using pen and paper.

- 26
- $\sqrt{26}$

Correct
Good job.

- $\sqrt{31}$
- $\sqrt{11}$
- $\sqrt{29}$

1 / 1 points

2.
Compute the squared distance between

$$\mathbf{x} = \begin{bmatrix} \frac{1}{2} \\ -1 \\ -\frac{1}{2} \end{bmatrix}$$

and

$$\mathbf{y} = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$

using the inner product defined as

$$\langle \mathbf{a}, \mathbf{b} \rangle = \mathbf{a}^T \begin{bmatrix} 2 & 1 & 0 \\ 1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix} \mathbf{b}$$

Do the exercise using pen and paper.

- $\sqrt{\frac{9}{2}}$
- $\sqrt{5}$
- $\frac{9}{2}$

5

Correct
Well done!

General inner products: lengths and distances

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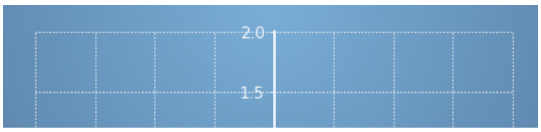
Practice Quiz, 5 questions

1 / 1 points

3.



Compute the length of $\mathbf{x} = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$ using the inner product defined by

$\langle \mathbf{a}, \mathbf{b} \rangle = \mathbf{a}^T \frac{1}{2} \begin{bmatrix} 5 & -1 \\ -1 & 5 \end{bmatrix} \mathbf{b}$

Do the exercise using pen and paper.

$\sqrt{6}$

Correct
Good job!

$\sqrt{12}$

12

6

$\sqrt{2}$

0 / 1 points

4.

Compute the distance (not squared) between

General inner products: lengths and distances

4/5 points (80.00%)

Practice Quiz, 5 questions

$$\mathbf{x} = \begin{bmatrix} 2 \\ 2 \\ 1 \end{bmatrix}$$

and

$$\mathbf{y} = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$$

using the inner product defined as

$$\langle \mathbf{a}, \mathbf{b} \rangle = \mathbf{a}^T \begin{bmatrix} 2 & 1 & 0 \\ 1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix} \mathbf{b}$$

Do the exercise using pen and paper (and calculator if necessary). Please enter a decimal number.

2.1213203435596424

Incorrect Response
You probably made a mistake. Try again.

1 / 1 points

5.

Compute the length of $\mathbf{x} = \begin{bmatrix} -1 \\ -1 \\ -1 \end{bmatrix}$ using the inner product defined as $\langle \mathbf{a}, \mathbf{b} \rangle = \mathbf{a}^T \mathbf{I} \mathbf{b}$ where $\mathbf{I}$ is the identity matrix.

Do the exercise using pen and paper.

- -3
- $-\sqrt{3}$
- 3
- $\sqrt{3}$

Correct
Well done! Our inner product is the dot product.