1.4.3 Dot or Inner Product (DOT)

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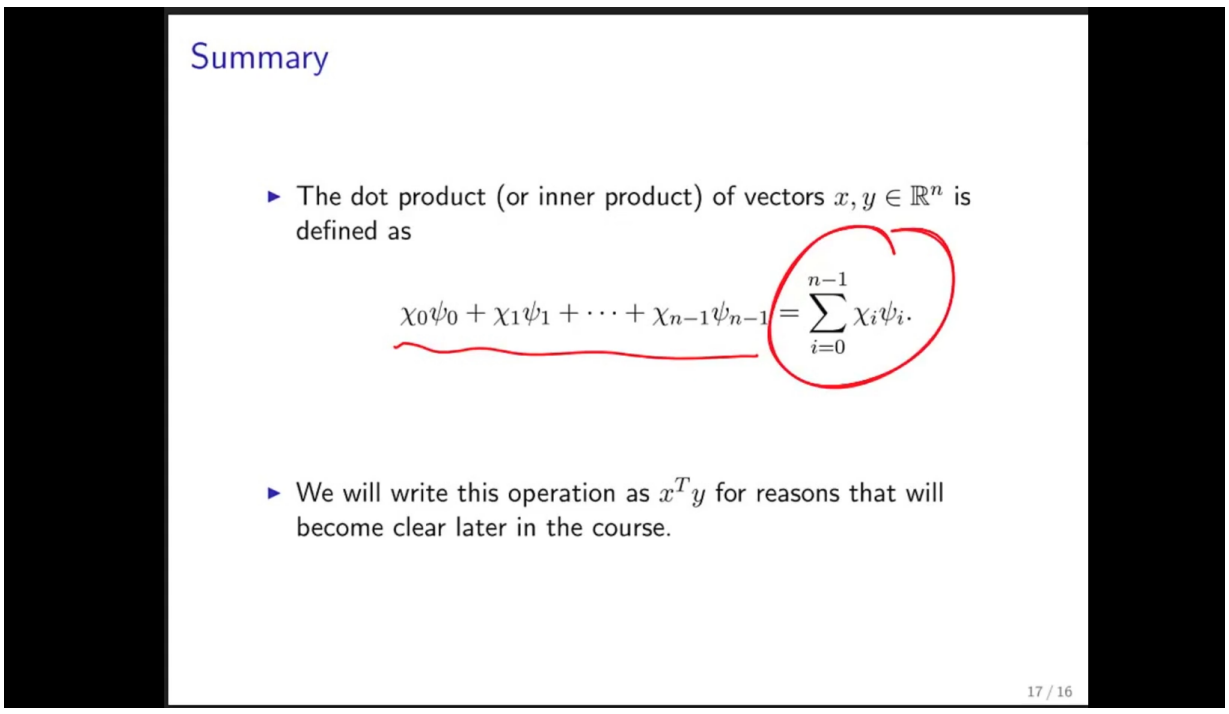
Week 1 due Oct 5, 2023 03:12 IST Completed

1.4.3 Dot or Inner Product (DOT)



4:40 / 4:54 2.0x

And then multiplying the row vector times a column vector means

multiplying the first components together, and adding that to the

second components multiplied together, and so forth.

And that gives you done the same result as before.

So in summary, the dot product of two vectors is defined by multiplying the

corresponding components together, and adding the results of that.

We can write that shorthand with the summation sign.

And in this course, almost always we will denote the dot product by x

transpose y.

Video

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Reading Assignment

0 points possible (ungraded)

Read Unit 1.4.3 of the notes. [LINK]

Done

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Cost of Dot product with vectors of size n (flops and memops) 4

Hi everyone, I would like to made some statements and discuss about floating points and memory complexity of Dot Product. - - Flops should b...

How to verify vector operations in the simplest way?

Calculator

for example，homework 1.4.3.10 and 1.4.3.12, how to verify using graphic or other method? because I can only rely on intuition now。

? 1.4.3.12
This seems to be a property of vectors. I can work it out but substitution but does a proof exist? 2

Question about 1.4.3.11
Where did vector Z come from in the explanation? It isn't brought up in the question itself, which only says vector x or y has to be equal to 0. Of ... 4

Purpose of transpose notation
Why do we do that way? Sometimes I realize it is compact to print on paper a transpose, but other than that? 6

Homework proof
Hello, I saw an earlier post which mentioned that there are homework transcript proofs available somewhere--is this true, or did I misunderstand... 2

Proof of the homework 1.4.3.4
The transcript of the proof for Homework 1.4.3.4 is wrong. It's not for this video. 5

? Solution for 1.4.3.7
Hi, Does anybody have the solution/calculation for 1.4.3.7? I got "11". Cheers, Erdal 2

Homework 1.4.3.1

1/1 point (graded)

$$\begin{pmatrix} 2 \\ 5 \\ -6 \\ 1 \end{pmatrix}^T \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{pmatrix} =$$

- 1
- 2
- -2
- 6
- Can't be done ✔

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Answers are displayed within the problem

Homework 1.4.3.2

1/1 point (graded)

$$\begin{pmatrix} 2 \\ 5 \\ -6 \\ 1 \end{pmatrix}^T \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \end{pmatrix} =$$

2 ✔ Answer: 2

Submit

Calculator

Answers are displayed within the problem

Homework 1.4.3.3

1/1 point (graded)

$$\begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \end{pmatrix}^T \begin{pmatrix} 2 \\ 5 \\ -6 \\ 1 \end{pmatrix} =$$

2 ✔ Answer: 2

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Answers are displayed within the problem

Homework 1.4.3.4

1/1 point (graded)

For $x, y \in \mathbb{R}^n, x^T y = y^T x.$

Always ✔ Answer: Always

Explanation
video

Transcripted in final section of this week
Image Proof

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Answers are displayed within the problem

Homework 1.4.3.5

1/1 point (graded)

$$\begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \end{pmatrix}^T \left(\begin{pmatrix} 2 \\ 5 \\ -6 \\ 1 \end{pmatrix} + \begin{pmatrix} 1 \\ 2 \\ 3 \\ 4 \end{pmatrix} \right) =$$

Calculator

12 ✔ Answer: 12

Submit

Answers are displayed within the problem

Homework 1.4.3.6

1/1 point (graded)

$$\begin{pmatrix}1\\1\\1\\1\end{pmatrix}^T \begin{pmatrix}2\\5\\-6\\1\end{pmatrix} + \begin{pmatrix}1\\1\\1\\1\end{pmatrix}^T \begin{pmatrix}1\\2\\3\\4\end{pmatrix} =$$

12 ✔ Answer: 12

Submit

Answers are displayed within the problem

Homework 1.4.3.7

1/1 point (graded)

$$\left(\begin{pmatrix}2\\5\\-6\\1\end{pmatrix} + \begin{pmatrix}1\\2\\3\\4\end{pmatrix}\right)^T \begin{pmatrix}1\\0\\0\\2\end{pmatrix} =$$

13 ✔ Answer: 13

Submit

Answers are displayed within the problem

Homework 1.4.3.8

1/1 point (graded)

For $x, y, z \in \mathbb{R}^n, x^T (y + z) = x^T y + x^T z.$

Always ✔ Answer: Always

Explanation
video

Calculator

Transcripted in final section of this week

Submit

Answers are displayed within the problem

Homework 1.4.3.9

1/1 point (graded)

For $x, y, z \in \mathbb{R}^n, (x+y)^T z = x^T z + y^T z.$

Always ✔ Answer: Always

Explanation
video

Transcripted in final section of this week
Image Proof

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Answers are displayed within the problem

Homework 1.4.3.10

1/1 point (graded)

For $x, y, z \in \mathbb{R}^n, (x+y)^T (x+y) = x^T x + 2x^T y + y^T y.$

Always ✔ Answer: Always

Explanation
video

Calculator

Transcripted in final section of this week
Image Proof

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Answers are displayed within the problem

Homework 1.4.3.11

1/1 point (graded)
For $x, y \in \mathbb{R}^n$, when $x^T y = 0$, $x = 0$ or $y = 0$.

Sometimes ✔ Answer: Sometimes

Explanation
video

Transcripted in final section of this week
Image Proof

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Answers are displayed within the problem

Homework 1.4.3.12

1/1 point (graded)
For $x \in \mathbb{R}^n, e_i^T x = x^T e_i = \chi_i,$

where χ_i equals the ith component of x.

Always ✔ Answer: Always

Explanation
video

Calculator

Transcripted in final section of this week
Image Proof

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Answers are displayed within the problem

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Calculator