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## 1.4.2 Linear Combinations of Vectors

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

# 1.4.2 Linear Combinations of Vectors

Example: linear combination of unit basis vector

Let  $x \in \mathbb{R}^n$

$$x = \begin{pmatrix} x_0 \\ x_1 \\ \vdots \\ x_{n-1} \end{pmatrix}.$$

Then

$$x = \begin{pmatrix} x_0 \\ x_1 \\ \vdots \\ x_{n-1} \end{pmatrix} = x_0 \begin{pmatrix} 1 \\ 0 \\ \vdots \\ 0 \\ 0 \end{pmatrix} + x_1 \begin{pmatrix} 0 \\ 1 \\ \vdots \\ 0 \\ 0 \end{pmatrix} + \cdots + x_{n-1} \begin{pmatrix} 0 \\ 0 \\ \vdots \\ 0 \\ 1 \end{pmatrix}$$

5:09 / 5:45

▶ 2.0x 🔊 🗑️ 📺 🔊

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Reading Assignment

0 points possible (ungraded)  
Read Unit 1.4.2 of the notes. [\[LINK\]](#)

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🗨️ [Video Quality down](#)

This particular video has much lower resolution compared to others. Is there something wrong?

3

🗨️ [Ignoring the cost of reading Kai\\_j](#)

🧮 Calculator

Page 26 states that each AXPY operation can ignore the cost of reading  $k_{ij}$ , I can understand that. But there will be  $n$  AXPY operation. So I assu...

- ?

Why  $mn$  memops, not  $2mn$  for a linear combination?

5
- The discussion in the notes says to ignore the cost of reading  $X_j$  when calculating the number of memops required to take a linear combination...
- ?

HW 1.4.2.1 and 1.4.2.2 -- Math does not render

3
- These two questions are not visible because the math does not render. It renders just fine for 1.4.2.3, but not for 1.4.2.1 and 1.4.2.2. I tried empty...

Homework 1.4.2.1

4/4 points (graded)

8

✓ Answer: 8

$3 \begin{pmatrix} 2 \\ 4 \\ -1 \\ 0 \end{pmatrix} + 2 \begin{pmatrix} 1 \\ 0 \\ 1 \\ 0 \end{pmatrix} =$

12

✓ Answer: 12

-1

✓ Answer: -1

0

✓ Answer: 0

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Answers are displayed within the problem

Homework 1.4.2.2

3/3 points (graded)

$(-3) \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} + 2 \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} + 4 \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix} =$

-3

✓ Answer: -3

2

✓ Answer: 2

4

✓ Answer: 4

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Homework 1.4.2.3

3/3 points (graded)

Find  $\alpha$ ,  $\beta$ , and  $\gamma$  such that

$\alpha \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} + \beta \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} + \gamma \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix}$

$\alpha =$

2

✓ Answer: 2

$\beta =$

-1

✓ Answer: -1


$\gamma =$

3

✓ Answer: 3

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Calculator

 Answers are displayed within the problem

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