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3.4.1 Via dot products

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 Calculator

Week 3 due Oct 18, 2023 06:12 IST

3.4.1 Via dot products

Please notice the following posting on the discussion board:

This post is visible to everyone.

3.4.1 Errors in arithmetic

discussion posted about 4 hours ago by [UnkleRhaukus](#)

0 Votes

+

★

...

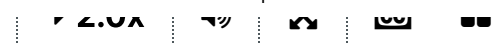
In the video of 3.4.1 at 3:00, there are arithmetic errors

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

(this post is about [Week 3 / 3.4.1](#))

Summary

- ▶ Matrix-vector multiplication can be thought of as inner products of rows of the matrix with the vector being multiplied.
- ▶ We are starting to see how more complex linear algebra operations are layered upon simpler ones.
- ▶ This layering is obvious both in the math and in the software.



Video

 [Download video file](#)

Transcripts

 [Download SubRip_\(.srt\)_file](#)

 [Download Text \(.txt\) file](#)

Reading Assignment

0 points possible (ungraded)

Read Unit 3.4.1 of the notes. [[LINK](#)].

 Done



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✓ Correct

Discussion

Topic: Week 3 / 3.4.1

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? Partitioning "x"?

I was getting a number of columns error until I deleted the partitioning of x and changed the function to read: `psi1 = laff_dot(a1t, x) + psi1`; Then i...

2

 Matrix Vector Multiple

Hi I have not understand why test the Home work 3.4.1.1 Function Mvmult_n_unb_var1(A,x,y) . it show the result difference from on paper . I chos...

3

 Incorrect Arithmetic?

When the matrix - vector multiplication at time ~ 3:20 is carried out, I get the vector (3 -3 -2) rather than (4 1 -2). Is this correct?

2

? Issue with function solution

Hi Robert & Maggie, I was looking at the algorithms document linked to in the solution. The algorithm for matrix vector multiplication uses the laf...

2

Homework 3.4.1.1

1/1 point (graded)

Implement the function

```
function [ y_out ] = Mvmult_n_unb_var1( A, x, y )
```

that corresponds to the algorithm

Algorithm: $y := \text{MVMULT_N_UNB_VAR1}(A, x, y)$

Partition	$A \rightarrow \left(\frac{A_T}{A_B} \right), y \rightarrow \left(\frac{y_T}{y_B} \right)$
------------------	--

where A_T is $0 \times n$ and y_T is 0×1

```

while  $m(A_T) < m(A)$  do

```

Repartition

$$\left(\frac{A_T}{A_B}\right) \rightarrow \left(\frac{A_0}{\frac{a_1^T}{A_2}}\right), \quad \left(\frac{y_T}{y_B}\right) \rightarrow \left(\frac{y_0}{\frac{\psi_1}{y_2}}\right)$$

where a_1 is a row



$$\Psi_1 := a_1^T x + \Psi_1$$

Continue with

$$\begin{pmatrix} A_T \\ A_B \end{pmatrix} \leftarrow \begin{pmatrix} A_0 \\ \frac{a_1^T}{A_2} \end{pmatrix}, \begin{pmatrix} y_T \\ y_B \end{pmatrix} \leftarrow \begin{pmatrix} y_0 \\ \frac{\Psi_1}{y_2} \end{pmatrix}$$

endwhile

Some links that will come in handy:

- [Spark](#) (alternatively, open the file LAFF-2.0xM/Spark/index.html)
- [PictureFLAME](#) (alternatively, open the file LAFF-2.0xM/PictureFLAME/PictureFLAME.html)

☒ Done/Skip



Answer:

- View a document that we put together that has most algorithms and MATLAB implementations that are homework problems in this week:

Week 3 algorithms and implementations.

This document is best viewed two pages, side by side, so that you can see the algorithm on the left and its implementation on the right.

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