6.2.3 Gauss Transforms

6.2.3 Gauss Transforms

Video

Download video file

Transcripts

Download SubRip (.srt) file

Download Text (.txt) file

Homework 6.2.3.1

60/60 points (graded)

Be careful filling in the answers. The "boxes" are place a bit awkwardly. The formatting gave us trouble...

Print out the Downloadable PDF for the exercise and fill in the values in the boxes. Then, answer the questions at the end of this homework.

$$\begin{pmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -2 \\ 4 & -2 & 6 \\ 6 & -4 & 2 \end{pmatrix} = \begin{pmatrix} \boxed{\alpha_{0,0}} & \boxed{\alpha_{0,1}} & \boxed{\alpha_{0,2}} \\ \boxed{\alpha_{1,0}} & \boxed{\alpha_{1,1}} & \boxed{\alpha_{1,2}} \\ \boxed{\alpha_{2,0}} & \boxed{\alpha_{2,1}} & \boxed{\alpha_{2,2}} \end{pmatrix}.$$

$$\begin{pmatrix} \alpha_{0,0} & \alpha_{0,1} & \alpha_{0,2} \\ \alpha_{1,0} & \alpha_{1,1} & \alpha_{1,2} \\ \alpha_{2,0} & \alpha_{2,1} & \alpha_{2,2} \end{pmatrix} =$$

2	4	-2
✔ Answer: 2	✔ Answer: 4	✔ Answer: -2
0	-10	10
✔ Answer: 0	✔ Answer: -10	✔ Answer: 10
6	-4	2
✔ Answer: 6	✔ Answer: -4	✔ Answer: 2

Explanation

$$\begin{pmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \left(\begin{array}{ccc} 2 & 4 & -2 \\ \hline 4 & -2 & 6 \\ \hline 6 & -4 & 2 \end{array}\right) = \left(\begin{array}{ccc} 2 & 4 & -2 \\ \hline 0 & -10 & 10 \\ \hline 6 & -4 & 2 \end{array}\right).$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 345 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -2 \\ 4 & -2 & 6 \\ 6 & -4 & 2 \end{pmatrix} = \begin{pmatrix} \boxed{\alpha_{0,0}} & \boxed{\alpha_{0,1}} & \boxed{\alpha_{0,2}} \\ \boxed{\alpha_{1,0}} & \boxed{\alpha_{1,1}} & \boxed{\alpha_{1,2}} \\ \star & \star & \star \end{pmatrix}.$$

$\alpha_{0,0}$ $\alpha_{0,1}$ $\alpha_{0,2}$
$\alpha_{1,0}$ $\alpha_{1,1}$ $\alpha_{1,2}$ $=$

2	4	-2
✔ Answer: 2	✔ Answer: 4	✔ Answer: -2
4	-2	6
✔ Answer: 4	✔ Answer: -2	✔ Answer: 6

Explanation

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 345 & 0 & 1 \end{pmatrix} \left(\begin{array}{ccc} 2 & 4 & -2 \\ \hline 4 & -2 & 6 \\ \hline 6 & -4 & 2 \end{array}\right) = \left(\begin{array}{ccc} 2 & 4 & -2 \\ \hline 4 & -2 & 6 \\ \hline \star & \star & \star \end{array}\right).$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -3 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -2 \\ 4 & -2 & 6 \\ 6 & -4 & 2 \end{pmatrix} = \begin{pmatrix} \boxed{\alpha_{0,0}} & \boxed{\alpha_{0,1}} & \boxed{\alpha_{0,2}} \\ \boxed{\alpha_{1,0}} & \boxed{\alpha_{1,1}} & \boxed{\alpha_{1,2}} \\ \boxed{\alpha_{2,0}} & \boxed{\alpha_{2,1}} & \boxed{\alpha_{2,2}} \end{pmatrix}.$$

$$\begin{pmatrix} \alpha_{0,0} & \alpha_{0,1} & \alpha_{0,2} \\ \alpha_{1,0} & \alpha_{1,1} & \alpha_{1,2} \\ \alpha_{2,0} & \alpha_{2,1} & \alpha_{2,2} \end{pmatrix} =$$

2	4	-2
✔ Answer: 2	✔ Answer: 4	✔ Answer: -2
4	-2	6
✔ Answer: 4	✔ Answer: -2	✔ Answer: 6
0	-16	8
✔ Answer: 0	✔ Answer: -16	✔ Answer: 8

Explanation

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -3 & 0 & 1 \end{pmatrix} \left(\begin{array}{ccc} 2 & 4 & -2 \\ \hline 4 & -2 & 6 \\ 6 & -4 & 2 \end{array}\right) = \left(\begin{array}{ccc} 2 & 4 & -2 \\ \hline 4 & -2 & 6 \\ 0 & -16 & 8 \end{array}\right).$$

$$\begin{pmatrix} 1 & 0 & 0 \\ \boxed{\lambda_{1,0}} & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -2 \\ 2 & -2 & 6 \\ 6 & -4 & 2 \end{pmatrix} = \begin{pmatrix} \boxed{\alpha_{0,0}} & \boxed{\alpha_{0,1}} & \boxed{\alpha_{0,2}} \\ 0 & \boxed{\alpha_{1,1}} & \boxed{\alpha_{1,2}} \\ \boxed{\alpha_{2,0}} & \boxed{\alpha_{2,1}} & \boxed{\alpha_{2,2}} \end{pmatrix}.$$

$$\begin{matrix} \alpha_{0,1} & \alpha_{0,2} \\ \alpha_{1,1} & \alpha_{1,2} \\ \alpha_{2,1} & \alpha_{2,2} \end{matrix} =$$

4 ✔	-2 ✔
Answer: 4	Answer: -2
-6 ✔	8 ✔
Answer: -6	Answer: 8
-4 ✔	2 ✔
Answer: -4	Answer: 2

$\lambda_{1,0} =$

-1 ✔ Answer: -1

$\alpha_{0,0} =$

2 ✔ Answer: 2

$\alpha_{2,0} =$

6 ✔ Answer: 6

Explanation

$$\left(\begin{array}{ccc} 1 & 0 & 0 \\ -1 & 1 & 0 \\ 0 & 0 & 1 \end{array}\right)\left(\begin{array}{ccc} 2 & 4 & -2 \\ 2 & -2 & 6 \\ \hline 6 & -4 & 2 \end{array}\right) = \left(\begin{array}{ccc} 2 & 4 & -2 \\ 0 & -6 & 8 \\ \hline 6 & -4 & 2 \end{array}\right).$$

$$\begin{pmatrix} 1 & 0 & 0 \\ \boxed{\lambda_{1,0}} & 1 & 0 \\ \boxed{\lambda_{2,0}} & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -2 \\ 2 & -2 & 6 \\ -4 & -4 & 2 \end{pmatrix} = \begin{pmatrix} \boxed{\alpha_{0,0}} & \boxed{\alpha_{0,1}} & \boxed{\alpha_{0,2}} \\ 0 & \boxed{\alpha_{1,1}} & \boxed{\alpha_{1,2}} \\ 0 & \boxed{\alpha_{2,1}} & \boxed{\alpha_{2,2}} \end{pmatrix}.$$

$\alpha_{0,1}$ $\alpha_{0,2}$
$\alpha_{1,1}$ $\alpha_{1,2}$ $=$
$\alpha_{2,1}$ $\alpha_{2,2}$

4 ✔	-2 ✔
Answer: 4	Answer: -2
-6 ✔	8 ✔
Answer: -6	Answer: 8
4 ✔	-2 ✔
Answer: 4	Answer: -2

$\lambda_{1,0} =$

-1 ✔ Answer: -1

$\lambda_{2,0} =$

2 ✔ Answer: 2

$\alpha_{0,0} =$

2 ✔ Answer: 2

Explanation

$$\begin{pmatrix} 1 & 0 & 0 \\ -1 & 1 & 0 \\ 2 & 0 & 1 \end{pmatrix} \left(\begin{array}{ccc} 2 & 4 & -2 \\ \hline 2 & -2 & 6 \\ \hline -4 & -4 & 2 \end{array}\right) = \left(\begin{array}{ccc} 2 & 4 & -2 \\ \hline 0 & -6 & 8 \\ \hline 0 & 4 & -2 \end{array}\right).$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & \boxed{\lambda_{2,1}} & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -2 \\ 0 & -10 & 10 \\ 0 & -16 & 8 \end{pmatrix} = \begin{pmatrix} \boxed{\alpha_{0,0}} & \boxed{\alpha_{0,1}} & \boxed{\alpha_{0,2}} \\ \boxed{\alpha_{1,0}} & \boxed{\alpha_{1,1}} & \boxed{\alpha_{1,2}} \\ \boxed{\alpha_{2,0}} & 0 & \boxed{\alpha_{2,2}} \end{pmatrix}.$$

$\alpha_{0,0}$ $\alpha_{0,2}$
$\alpha_{1,0}$ $\alpha_{1,2}$ $=$
$\alpha_{2,0}$ $\alpha_{2,2}$

2 ✔ Answer: 2

-2 ✔ Answer: -2

0 ✔ Answer: 0

10 ✔ Answer: 10

0 ✔ Answer: 0

-8 ✔ Answer: -8

$\lambda_{2,1} =$

-1.6 ✔ Answer: -1.6

$\alpha_{0,1} =$

4 ✔ Answer: 4

$\alpha_{1,1} =$

-10

✔ **Answer:** -10

$$\begin{pmatrix} 1 & 0 & \boxed{v_{0,2}} \\ 0 & 1 & \boxed{v_{1,2}} \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -8 \\ 1 & 1 & -4 \\ -1 & -2 & 4 \end{pmatrix} = \begin{pmatrix} \boxed{\alpha_{0,0}} & \boxed{\alpha_{0,1}} & 0 \\ \boxed{\alpha_{1,0}} & \boxed{\alpha_{1,1}} & 0 \\ \boxed{\alpha_{2,0}} & \boxed{\alpha_{2,1}} & \boxed{\alpha_{2,2}} \end{pmatrix}.$$

$$\begin{matrix} \alpha_{0,0} & \alpha_{0,1} \\ \alpha_{1,0} & \alpha_{1,1} \\ \alpha_{2,0} & \alpha_{2,1} \end{matrix} =$$

0 ✔	0 ✔
Answer: 0	**Answer:** 0
0 ✔	-1 ✔
Answer: 0	**Answer:** -1
-1 ✔	-2 ✔
Answer: -1	**Answer:** -2

$v_{0,2} =$

2

✔ **Answer:** 2

$v_{1,2} =$

1

✔ **Answer:** 1

$\alpha_{2,2} =$

4

✔ **Answer:** 4

Explanation

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & -1.6 & 1 \end{pmatrix} \left(\begin{array}{ccc} 2 & 4 & -2 \\ \hline 0 & -10 & 10 \\ \hline 0 & -16 & 8 \end{array}\right) = \left(\begin{array}{ccc} 2 & 4 & -2 \\ \hline 0 & -10 & 10 \\ \hline 0 & 0 & -8 \end{array}\right).$$

Submit

Answers are displayed within the problem

Discussion

Hide Discussion

Topic: Week 6 / 6.2.3

Add a Post

Show all posts ▼ by recent activity ▼

6.2.3.1 - Could be less painful 5

This problem would go a lot more smoothly if each subproblem had its own Submit button and if the answer was still in the form o...

Grrrr. In the following video, Robert made a sign error in the final step:

From one of the particupants:

I just want to clarify that the final answer for the homework 6.2.3.2 shown in the video should be

```
1     1     2    -1
0    -2     1    -4
0     0     **2**    -4
```

NOT

```
1     1     2    -1
0    -2     1    -4
0     0     **-2**    -4
```

Video for Homework 6.2.3.2

Video
Download video file

Transcripts
Download SubRip (.srt) file

Download Text (.txt) file

Homework 6.2.3.2

1/1 point (graded)

Practice reducing an appended sytem to an upper triangular form with Gauss transforms by visiting the "Practice with Gaussian Elimination" webpage we created for you. For now, only work with the top three parts of that webpage.

Problem 3, for Unit 6.2.3 in that webpage, starts with the appended system on the left and transforms it in to the appended system on the right after 1 Step, as shown below:

$$\left[\begin{array}{rrr} 1 & 0 & 0 \\ -3 & 1 & 0 \\ 4 & 0 & 1 \end{array}\right]\left[\begin{array}{rrr|r} 1 & 1 & -4 & 14 \\ 3 & 1 & -9 & 32 \\ -4 & 0 & 11 & -38 \end{array}\right] = \left[\begin{array}{rrr|r} 1 & 1 & -4 & 14 \\ 0 & -2 & 3 & 32 \\ 0 & 4 & -5 & -38 \end{array}\right]$$

FALSE ✔ **Answer:** FALSE

Submit

Answers are displayed within the problem