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6.2.3 Gauss Transforms

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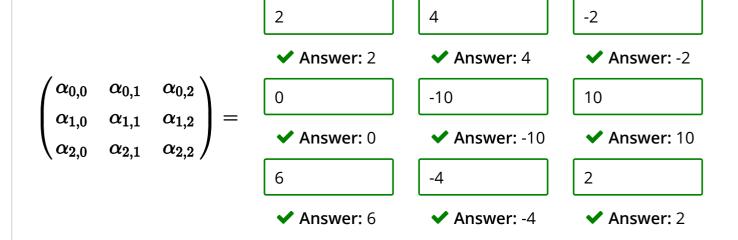
Homework 6.2.3.1

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 <u>Downloadable PDF</u> for the exercise and fill in the values in the boxes. Then, answer the guestions at the end of this homework.

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



$$\begin{pmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -2 \\ \hline 4 & -2 & 6 \\ \hline 6 & -4 & 2 \end{pmatrix} = \begin{pmatrix} 2 & 4 & -2 \\ \hline 0 & -10 & 10 \\ \hline 6 & -4 & 2 \end{pmatrix}.$$

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

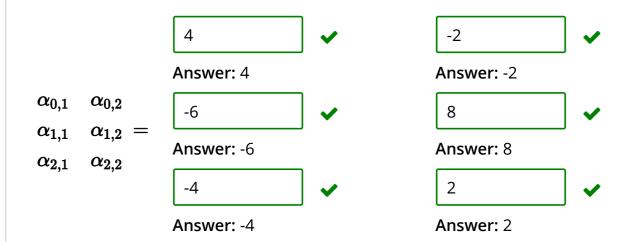
$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 345 & 0 & 1 \end{pmatrix} \begin{pmatrix} \frac{2}{4} & \frac{4}{-2} & \frac{2}{6} \\ \hline 6 & -4 & 2 \end{pmatrix} = \begin{pmatrix} \frac{2}{4} & \frac{4}{-2} & \frac{2}{6} \\ \hline \star & \star & \star \end{pmatrix}.$$

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

$$\begin{pmatrix} \alpha_{0,0} & \alpha_{0,1} & \alpha_{0,2} \\ \alpha_{1,0} & \alpha_{1,1} & \alpha_{1,2} \\ \alpha_{2,0} & \alpha_{2,1} & \alpha_{2,2} \end{pmatrix} = \begin{pmatrix} Answer: 2 & Answer: 4 & Answer: -2 \\ 4 & -2 & 6 \\ \hline & Answer: 4 & Answer: -2 & Answer: -6 \\ \hline & Answer: 0 & Answer: -16 & Answer: 8 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -3 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -2 \\ \hline 4 & -2 & 6 \\ 6 & -4 & 2 \end{pmatrix} = \begin{pmatrix} 2 & 4 & -2 \\ \hline 4 & -2 & 6 \\ 0 & -16 & 8 \end{pmatrix}.$$

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



$$\begin{pmatrix} 1 & 0 & 0 \\ -1 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -2 \\ 2 & -2 & 6 \\ \hline 6 & -4 & 2 \end{pmatrix} = \begin{pmatrix} 2 & 4 & -2 \\ 0 & -6 & 8 \\ \hline 6 & -4 & 2 \end{pmatrix}.$$

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

$$\lambda_{1,0} =$$

$$\begin{array}{c} -1 & \checkmark \text{ Answer: -1} \\ \lambda_{2,0} = & \\ \hline 2 & \checkmark \text{ Answer: 2} \\ \\ \alpha_{0,0} = & \\ \hline 2 & \checkmark \text{ Answer: 2} \\ \end{array}$$

$$\begin{pmatrix} 1 & 0 & 0 \\ -1 & 1 & 0 \\ 2 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -2 \\ \hline 2 & -2 & 6 \\ \hline -4 & -4 & 2 \end{pmatrix} = \begin{pmatrix} 2 & 4 & -2 \\ \hline 0 & -6 & 8 \\ \hline 0 & 4 & -2 \end{pmatrix}.$$

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

$$\lambda_{2,1} =$$

$$\begin{array}{c} -1.6 \\ & \checkmark \text{ Answer: -1.6} \\ \\ \alpha_{0,1} = \\ \hline 4 \\ & \checkmark \text{ Answer: 4} \end{array}$$

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

$$-10$$
Answer: -10

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

$$v_{0,2} =$$
2

Answer: 2

 $v_{1,2} =$
1

Answer: 1

 $\alpha_{2,2} =$
4

Answer: 4

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & -1.6 & 1 \end{pmatrix} \begin{pmatrix} 2 & 4 & -2 \\ \hline 0 & -10 & 10 \\ \hline 0 & -16 & 8 \end{pmatrix} = \begin{pmatrix} 2 & 4 & -2 \\ \hline 0 & -10 & 10 \\ \hline 0 & 0 & -8 \end{pmatrix}.$$

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1 Answers are displayed within the problem

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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

NOT

Video for Homework 6.2.3.2



Video

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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:

$$\begin{bmatrix} 1 & 0 & 0 \\ -3 & 1 & 0 \\ 4 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 & -4 & 14 \\ 3 & 1 & -9 & 32 \\ -4 & 0 & 11 & -38 \end{bmatrix} = \begin{bmatrix} 1 & 1 & -4 & 14 \\ 0 & -2 & 3 & 32 \\ 0 & 4 & -5 & -38 \end{bmatrix}$$

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1 Answers are displayed within the problem

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