2. Solve for x

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Problem Set A due Sep 15, 2021 20:30 IST

Practice

In each of the following problems, solve for $\vec{x}$ in $A\vec{x} = \vec{b}$ by finding A^{-1}.

Solve 1

2/2 points (graded)

$$\begin{pmatrix} -7 & 4 \\ 3 & 8 \end{pmatrix} \vec{x} = \begin{pmatrix} 8 \\ -52 \end{pmatrix} \tag{5.165}$$

(Enter a matrix using notation such as `[[a,b],[c,d]]`.)

$A^{-1} =$ [[-8/68,4/68],[3/68,7/68]] ✔ **Answer:** [[-2/17, 1/17], [3/68, 7/68]]

(Enter a vector using notation such as `[a,b]`.)

$\vec{x} =$ [-4,-5] ✔ **Answer:** [-4, -5]

Solution:

Using the formula

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix}^{-1} = \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}, \tag{5.166}$$

we obtain

$$A^{-1} = \begin{pmatrix} -2/17 & 1/17 \\ 3/68 & 7/68 \end{pmatrix}. \tag{5.167}$$

Then we obtain $\vec{x}$ through the matrix product

$$\vec{x} = \begin{pmatrix} -2/17 & 1/17 \\ 3/68 & 7/68 \end{pmatrix} \begin{pmatrix} 8 \\ -52 \end{pmatrix} = \begin{pmatrix} -4 \\ -5 \end{pmatrix} \tag{5.168}$$

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Answers are displayed within the problem

Solve 2

2/2 points (graded)

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$$\begin{pmatrix} 8 & -2 \\ -5 & -1 \end{pmatrix} \vec{x} = \begin{pmatrix} -62 \\ 50 \end{pmatrix} \tag{5.169}$$

(Enter a matrix using notation such as `[[a,b],[c,d]]`.)

$A^{-1} =$ [[1/18,-1/9],[-5/18,-4/9]] ✔ **Answer:** [[1/18, -1/9], [-5/18, -4/9]]

(Enter a vector using notation such as `[a,b]`.)

$\vec{x} =$ [-9,-5] ✔ **Answer:** [-9, -5]

Solution:

Using the formula

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix}^{-1} = \frac{1}{ad-bc} \begin{pmatrix} d & -c \\ -b & a \end{pmatrix}, \tag{5.170}$$

we obtain

$$A^{-1} = \begin{pmatrix} 1/18 & -1/9 \\ -5/18 & -4/9 \end{pmatrix}. \tag{5.171}$$

Then we obtain $\vec{x}$ through the matrix product

$$\vec{x} = \begin{pmatrix} 1/18 & -1/9 \\ -5/18 & -4/9 \end{pmatrix} \begin{pmatrix} -62 \\ 50 \end{pmatrix} = \begin{pmatrix} -9 \\ -5 \end{pmatrix} \tag{5.172}$$

Submit You have used 1 of 3 attempts

Answers are displayed within the problem

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