UTAustinX UT.5.05x
Linear Algebra - Foundations to Frontiers

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E1.3.3 Exam Question 3

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Calculator

Exam 1 due Oct 31, 2023 09:12 IST   Completed

Question 3

3/3 points (graded)

For each of the following functions $f : \mathbb{R}^3 \to \mathbb{R}^2$, indicate whether it is a linear transformation.

1. $f\left(\begin{pmatrix} \chi_0 \\ \chi_1 \\ \chi_2 \end{pmatrix}\right) = \begin{pmatrix} 1 & -1 & 2 \\ 2 & 3 & -1 \end{pmatrix} \begin{pmatrix} \chi_0 \\ \chi_1 \\ \chi_2 \end{pmatrix}$

   [TRUE ⌄]   ✔ Answer: TRUE

   Answer:
   TRUE
   Any function $f(x) = Ax$ where A is a matrix is a linear transformation.

2. $f\left(\begin{pmatrix} \chi_0 \\ \chi_1 \\ \chi_2 \end{pmatrix}\right) = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$

   [TRUE ⌄]   ✔ Answer: TRUE

   Answer:
   TRUE
   Building on the last problem, pick $A = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$ and realize that then $f(x) = Ax$.

3. $f\left(\begin{pmatrix} \chi_0 \\ \chi_1 \\ \chi_2 \end{pmatrix}\right) = \begin{pmatrix} 1 & -1 & 2 \\ 2 & 3 & -1 \end{pmatrix} \begin{pmatrix} \chi_0 \\ \chi_1 \\ \chi_2 \end{pmatrix} + \begin{pmatrix} 1 \\ 0 \end{pmatrix}$

   [FALSE ⌄]   ✔ Answer: FALSE

   Answer:
   FALSE
   $f(0) \neq 0$.

[Submit]

ℹ Answers are displayed within the problem

Discussion

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