Grading Grid

Homework 5

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Section 002

2.5: 12. x_1^*: $\left[\begin{array}{cc|c} 1 & 2 & 1 \\ -3 & -4 & 0 \end{array}\right] + 3R_1$

$\left[\begin{array}{cc|c} 1 & 2 & 1 \\ 0 & 2 & 3 \end{array}\right]$

$2y = 3 \quad y = 3/2$

$x = -2$

$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -2 \\ 3/2 \end{bmatrix}$

x_2^*: $\left[\begin{array}{cc|c} 1 & 2 & 0 \\ -3 & -4 & 1 \end{array}\right] + 3R_1$

$\left[\begin{array}{cc|c} 1 & 2 & 0 \\ 0 & 2 & 1 \end{array}\right]$

$2y = 1 \quad y = 1/2$

$x = -1$

$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -1 \\ 1/2 \end{bmatrix}$

$\left[\begin{array}{cc|c} 1 & 2 & 1 \\ -3 & -4 & 4 \end{array}\right] + 3R_1$

$\left[\begin{array}{cc|c} 1 & 2 & 1 \\ 0 & 2 & 7 \end{array}\right]$

$2y = 7 \quad y = 7/2$

$x + 7 = 1 \quad x = -6$

$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -6 \\ 7/2 \end{bmatrix} = \begin{bmatrix} -2 \\ 3/2 \end{bmatrix} + 4\begin{bmatrix} -1 \\ 1/2 \end{bmatrix} = x_1^* + 4x_2^*$

4. a. x_1^*: $\begin{bmatrix} 2 & -1 & -5 \\ 1 & -4 & -6 \\ 3 & 2 & 4 \end{bmatrix}\begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} = \begin{bmatrix} 2-1 \\ 1-4 \\ 3+2 \end{bmatrix} = \begin{bmatrix} 1 \\ -3 \\ 5 \end{bmatrix}$

x_2^*: $\begin{bmatrix} 2 & -1 & -5 \\ 1 & -4 & -6 \\ 3 & 2 & -4 \end{bmatrix}\begin{bmatrix} -3 \\ 3 \\ -2 \end{bmatrix} = \begin{bmatrix} -6-3+10 \\ -3-12+12 \\ -9+6+8 \end{bmatrix} = \begin{bmatrix} 1 \\ -3 \\ 5 \end{bmatrix}$

b. $\vec{x} = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} + x_3\begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix}$

7.1: 1. c. No; $F(a,b,c) + F(d,e,f) = a+b+d+e+6 \neq a+b+d+e+3 = F(a+d, b+e, c+f)$

d. Yes; $F(a,b,c) + F(d,e,f) = (a+d)-(b+e)-(c+f) = F(a+d, b+e, c+f)$, $cF(g,h,i) = cg-ch-ci = F(cg, ch, ci)$

e. No; $F(a,b,c) + F(d,e,f) = abc + def \neq (a+d)(b+e)(c+f) = F(a+d, b+e, c+f)$

7.1: 3. a. Yes, $F\begin{pmatrix}a\\b\end{pmatrix}+F\begin{pmatrix}c\\d\end{pmatrix}=\begin{bmatrix}a+c-b-d\\a+c+b+d\end{bmatrix}=F\begin{pmatrix}a+c\\b+d\end{pmatrix}$

and $cF\begin{pmatrix}a\\b\end{pmatrix}=\begin{pmatrix}ca-cb\\ca+cb\end{pmatrix}=F\begin{pmatrix}ca\\cb\end{pmatrix}$

b. No, $F\begin{pmatrix}a\\b\end{pmatrix}+F\begin{pmatrix}c\\d\end{pmatrix}=\begin{pmatrix}a+c+b+d+2\\a+c-b-d-2\end{pmatrix}$

$\neq\begin{pmatrix}a+c+b+d+1\\a+c-b-d-1\end{pmatrix}=F\begin{pmatrix}a+c\\b+d\end{pmatrix}$

c. No, $F\begin{pmatrix}a\\b\end{pmatrix}+F\begin{pmatrix}c\\d\end{pmatrix}=\begin{pmatrix}ab+cd\\a+c-b-d\end{pmatrix}\neq\begin{pmatrix}(a+b)(c+d)\\a+c-b-d\end{pmatrix}$

$=F\begin{pmatrix}a+c\\b+d\end{pmatrix}$

7. $F\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}y+x+1\\-1x-y1\end{pmatrix}$

a. Not cont. because those vectors aren't linearly independent

7.2: 24. b. $\begin{bmatrix}2(w+y) & 0\\ 0 & 3(z+y)\end{bmatrix}$ c. $\begin{bmatrix}1(y) & 1(y)\\ -1(x) & 1(x)\end{bmatrix}$ d. $\begin{bmatrix}2(\frac{1}{2}) & -1(-1)\\ 1(2) & 1(-1)\end{bmatrix}$

25. a. $\begin{bmatrix}2(-3) & 2(1) & 2(1)\\ -1(3) & -1(-1) & -1(1)\\ -2(3) & -2(-1) & -2(1)\end{bmatrix}$ b. $\begin{bmatrix}1(-3) & 1(2) & 1(2)\\ 1(-3) & -1(-1) & 1(1)\\ 1(-3) & 1(2) & 1(0)\end{bmatrix}$