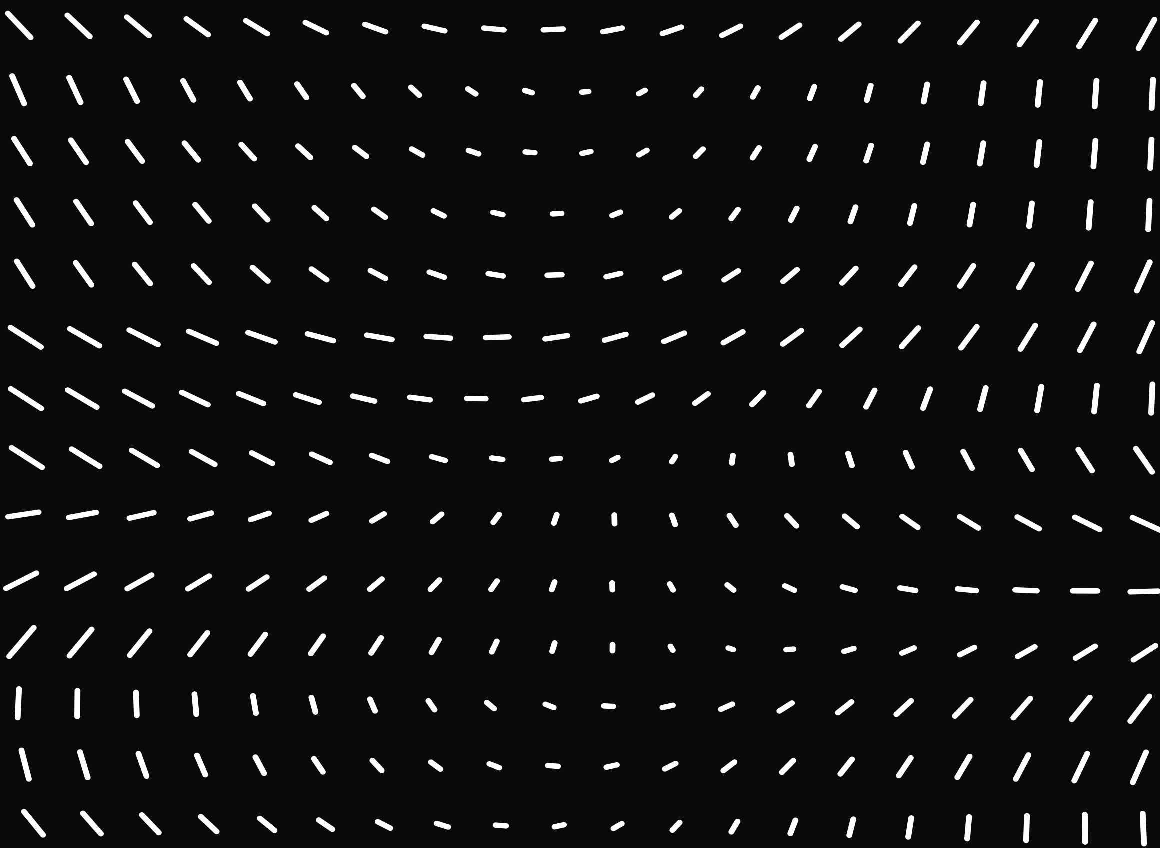

Hw #1.

§1.

1.1. T   1.9 T

1.2 F

1.3 F

1.4 T

1.5 F

1.6 T

§2.

1.13 F

1.14. T

1.16 F

1.17 F

1.18 T

1.55.

(a) $\left(\begin{array}{cc|c} 1 & -3 & 2 \\ -2 & 6 & -4 \end{array}\right) \to \left(\begin{array}{cc|c} 1 & -3 & 2 \\ 0 & 0 & 0 \end{array}\right)$. $\therefore$ $x - 3y = 2$ is the solution set.

i.e. y is free so $\underbrace{x = 2 + 3y}_{\text{Parametric form.}}$

$$\begin{pmatrix} 2 \\ 0 \end{pmatrix} + \begin{pmatrix} 3 \\ 1 \end{pmatrix} y = \begin{pmatrix} 2+3y \\ y \end{pmatrix}$$

choose $y = t$ as a parameter

(e) $\left(\begin{array}{cccc|c} 1 & 0 & 0 & 1 & 11 \\ 0 & 1 & 0 & -1 & -6 \\ 0 & 0 & 1 & 1 & 2 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right)$

$x_1 + x_4 = 11$ $x_1 = 11 - x_4$

$x_2 - x_4 = -6$ $x_2 = -6 + x_4$

$x_3 + x_4 = 2$ $x_3 = 2 - x_4$

$$\begin{pmatrix} 11 \\ -6 \\ 2 \\ 0 \end{pmatrix} + t \begin{pmatrix} -1 \\ 1 \\ -1 \\ 1 \end{pmatrix} = \begin{pmatrix} 11 - t \\ -6 + t \\ 2 - t \\ 0 + t \end{pmatrix}$$

(k) $\begin{pmatrix} 1 & 0 & \frac{3}{4} & 1 & 1\frac{1}{4} \\ 0 & 1 & \frac{1}{4} & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$?

Inconsistent system. ☹

No Solutions.

§ 1.3

1.20 F
1.21 T
1.22 T
1.24 T

1.67.

(a) $-a-2b+c=0$

(b) $+a-5b+2c=0$

(c) $-a+c=0$

§ 1.4

1.25 F
1.26 T
1.27 T
1.29 F
1.31 F
1.33 F
1.34 T
1.36 F

1.93. (b) $\begin{pmatrix} -5 & 17 \\ 4 & 2 \\ 3 & 1 \\ 5 & -5 \end{pmatrix}\begin{pmatrix} 2 \\ 1 \end{pmatrix} = \begin{pmatrix} 7 \\ 10 \\ 7 \\ 5 \end{pmatrix}$.

(c) $\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{pmatrix}\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} x+2y+3z \\ 4x+5y+6z \end{pmatrix}$

$2 \times 3 \quad 3 \times 1$

1.104 Basis for Null Space is: $\left\{ \begin{pmatrix} -2 \\ 1 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} -2 \\ 1 \\ 0 \\ 1 \end{pmatrix} \right\}$

1.114 (c). $W = \left\{ A \in M_{2,2}(\mathbb{R}) : A = \begin{pmatrix} a & a+b+c \\ b & c \end{pmatrix},\ a,b,c \in \mathbb{R} \right\}$

1. $\begin{pmatrix} 1 & 3 \\ 1 & 1 \end{pmatrix}$

2. $\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$

3. Since "+" in $M_{2,2}(\mathbb{R})$ is Component-wise, and it Contains 0 matrix, it is easy to check via subspace test. i.e. if $A, B \in W \Rightarrow \lambda(A-B) \in W$, $\lambda \in \mathbb{R}$.

4. Consider the Basis. $\left\{ \begin{pmatrix} 1 & 1 \\ 0 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 1 \\ 0 & 1 \end{pmatrix} \right\}$ for W.