Miscellaneous from the HW

23, 1.2 Suppose a 3×5 coefficient matrix has three pivots. Is the system consistent?

Suppose a 5×3 coefficient matrix has three pivots. Is the system consistent?

Suppose a coefficient matrix has the maximum number of pivots possible. Is the system always going to be consistent?

28, 1.2 What would you have to know about the pivot columns in an augmented matrix in order to know that the linear system is consistent and has a unique solution? (Conclude with the Existence and Uniqueness Theorem)

23-24, 1.3 The span $\{\mathbf{u}, \mathbf{v}\}$ is always visualized as a plane through the origin.

25. Denote the columns of A by $\mathbf{a}_1, \mathbf{a}_2, \mathbf{a}_3$ below, and let $W = \text{span}\,\{\mathbf{a}_1, \mathbf{a}_2, \mathbf{a}_3\}$, where

$$A = \begin{bmatrix} 2 & 0 & 6 \\ 1 & 8 & 5 \\ 0 & -2 & 1 \end{bmatrix} \qquad \mathbf{b} = \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix}$$

(a) Is $\mathbf{b} \in \{\mathbf{a}_1, \mathbf{a}_2, \mathbf{a}_3\}$? How many vectors are in $\{\mathbf{a}_1, \mathbf{a}_2, \mathbf{a}_3\}$?

(b) Is $\mathbf{b} \in W$? How many vectors are in W?

(c) Show that $\mathbf{a}_3 \in W$.

8. See figure below. Write $\mathbf{w}, \mathbf{x}, \mathbf{y}, \mathbf{z}$ as linear combinations of $\mathbf{u}, \mathbf{v}$:

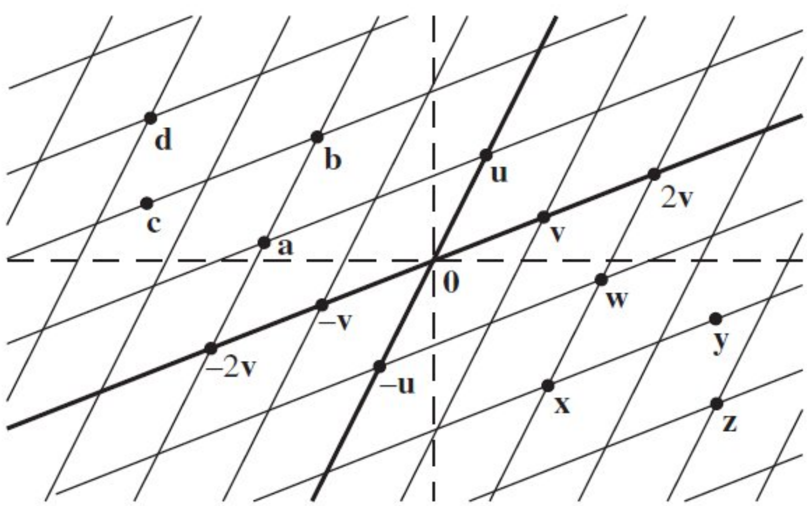

Figure for Exercises 7 and 8