CSci 2033 Practice Exercises Set #12 April 2, 2018

Text

Sect. 4.2: Exercises 9, 15, 19, 23

1 For the following matrix

$$A = \begin{bmatrix} 1 & 1 & 0 & 2 & -3 \\ 2 & 2 & -1 & 4 & -7 \\ 1 & 1 & -1 & 2 & -4 \end{bmatrix}$$

find the set of all vectors that satisfy $Ax = 0$.

This set is $\text{Nul}(A)$, the null space of A.

In which vector space V is it included?

Is this is a subspace of V?

Express $\text{Nul}(A)$ as the span of 3 vectors.

2 True or False:

(a) The null space of an 5×3 matrix is in $\mathbb{R}^5$

(b) The column space of a matrix A is the range of the mapping $x \to Ax$

(c) If the equation $Ax = b$ is consistent then $\text{Col}(A)$ is $\mathbb{R}^m$

(d) If the equation $Ax = b$ has a solution for every b then $\text{Col}(A)$ is $\mathbb{R}^m$

(e) $\text{Col}(A)$ is the set all vectors that can be written as Ax for some x