Chapter 4.1

Linear Algebra with applications to differential equations

College of the Atlantic. Winter 2019

1. (Re)introduce yourself to your partners and briefly share something you did on Wednesday instead of linear algebra.

2. Here are two vectors in $\mathbb{R}^2$: $\vec{u} = (1, 2), \vec{v} = (1, -1), \vec{w} = (4, 4)$.

   (a) Are $\vec{u}$ and $\vec{v}$ linearly dependent or independent?

   (b) Are $\vec{u}$ and $\vec{w}$ linearly dependent or independent?

   (c) Solve for a and b: $a\vec{u} + b\vec{v} = 0$.

   (d) Solve for a and b: $a\vec{u} + b\vec{v} = \vec{w}$.

3. Here are three vectors in $\mathbb{R}^3$: $\vec{u} = (1, 2, 0), \vec{v} = (1, -1, 1), \vec{w} = (2, 1, 1)$. Are $\vec{v}, \vec{u}, \vec{w}$ linearly dependent or independent

4. Here are three vectors in $\mathbb{R}^3$: $\vec{u} = (1, 2, 7), \vec{v} = (0, 1, 2), \vec{w} = (2, -2, 2)$. Are $\vec{v}, \vec{u}, \vec{w}$ linearly dependent or independent? (Does this problem look familiar?)

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5. Let V consist of all vectors $\vec{x} = (x_1, x_2, x_3)$ such that $x_1 + x_2 + x_3 = 0$. Is V a subspace of $\mathbb{R}^3$?

6. Let V consist of all vectors $\vec{x} = (x_1, x_2, x_3)$ such that $x_1 + x_2 + x_3 = 1$. Is V a subspace of $\mathbb{R}^3$?