Chapter 4.3 & 4.4

Linear Algebra with applications to differential equations

College of the Atlantic. Winter 2019

1. (Re)introduce yourself to your partners and briefly discuss you plans for vacation next week, or your thoughts about what you would do next week if you had vacation.

2. Determine if each of the following sets of vectors are linearly independent:

   (a) $\vec{v_1} = (1, 2, 0)$, $\vec{v_2} = (1, 2, -1)$, $\vec{v_3} = (1, 0, 2)$.

   (b) $\vec{v_1} = (1, 2, 2, 1)$, $\vec{v_2} = (2, 3, 4, 1)$, $\vec{v_3} = (3, 8, 7, 5)$

   (c) $\vec{v_1} = (1, 4, 0)$, $\vec{v_2} = (1, 2, -1)$, $\vec{v_3} = (1, 5, -2)$, $\vec{v_4} = (0, 1, 0)$.

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3. Determine the general solution to the following system:

$$\begin{aligned} 3x_1 + 6x_x - \ x_3 - 5x_4 + 5x_5 &= 0 \\ 2x_1 + 4x_2 - \ x_3 - 3x_4 + 2x_5 &= 0 \\ 3x_1 + 6x_2 - 2x_3 - 4x_4 + \ x_5 &= 0 \end{aligned} \tag{1}$$

   What is the basis for the solution space of this system?