$x_1 = x_3'$

$x_2 = -2x_3'$

$x_2 = -2x_1$

$(1, -2, 1)$

$-8x_3 + 9x_3 \ -x_3$

$-2x_3$

$x_1 + 4x_2 + 7x_3 = 0$

$2x_1 + 5x_2 + 8x_3 = 0$

$3x_1 + 6x_2 + 9x_3 = 0$

Exercises on the geometry of linear equations

$x_1 + 2x_2 + 3x_3 = 0$

$2x_2 + 4x_3 = 0$

$x_2 = -2x_3$

✔

Problem 1.1: (1.3 #4. *Introduction to Linear Algebra:* Strang) Find a combination $x_1\mathbf{w}_1 + x_2\mathbf{w}_2 + x_3\mathbf{w}_3$ that gives the zero vector:

$W_1 - 2W_2 + W_3$

$\sim 2 \quad 1$

$$\mathbf{w}_1 = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \quad \mathbf{w}_2 = \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix} \quad \mathbf{w}_3 = \begin{bmatrix} 7 \\ 8 \\ 9 \end{bmatrix}.$$

$$x_1\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} + x_2\begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix} + x_3\begin{bmatrix} 7 \\ 8 \\ 9 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

linear combi

zero vector를 나타내기 위한이

예에는 dependent함.

그래서 plane 위에 나타남

서로 다른 3개의 벡터는 R^2에

표현가치위한에 → 이들은

(선형성)로 된다.

독립이지 X.

Those vectors are (independent)(dependent).
The three vectors lie in a ___plane___. The matrix W with those columns is *not invertible*.

$$\begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} \quad 2\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

Problem 1.2: Multiply:
$3\times3 \qquad 3\times1$
$$\begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 3 \\ 4 & 1 & 1 \end{bmatrix}\begin{bmatrix} 3 \\ -2 \\ 1 \end{bmatrix}. = \begin{bmatrix} 3-4 \\ 6+3 \\ 12-2+1 \end{bmatrix} \begin{bmatrix} -1 \\ 9 \\ 11 \end{bmatrix}$$

Problem 1.3: True or false: A 3 by 2 matrix A times a 2 by 3 matrix B equals a 3 by 3 matrix AB. If this is false, write a similar sentence which is correct.

$A : 3\times2$
$B : 2\times3$ $\Rightarrow AB : 3\times3$

true

18.06SC Linear Algebra
Fall 2011