Sept. 6 /17

LINEAR PROG.

MATRIX MULTIPLICATION

↳ Row × Column

$$A = \begin{bmatrix} 1 & 1 & 2 \\ 2 & 3 & 2 \end{bmatrix} \qquad B = \begin{bmatrix} 1 & 2 \\ 2 & 1 \\ 1 & 2 \end{bmatrix}$$

$A_{2\times 3} \times B_{3\times 2} = C_{2\times 2}$

SAME — Therefore

$C = \begin{bmatrix} \text{Row 1} \times \text{Column 1} & \text{Row 1} \times \text{Column 2} \\ & \end{bmatrix}$

- Gauss-Jordan Elimination (nightmare)

$$A|b = \left(\begin{array}{ccc|c} 2 & 2 & 1 & 9 \\ 2 & -1 & 2 & 6 \\ 1 & -1 & 2 & 5 \end{array}\right) \xrightarrow{\times 1/2} \left(\begin{array}{ccc|c} 1 & 1 & 1/2 & 9/2 \\ 2 & -1 & 2 & 6 \\ 1 & -1 & 2 & 5 \end{array}\right) \xrightarrow{R2 + (-2)R_1 = R_2}$$

$$\left(\begin{array}{ccc|c} 1 & 1 & 1/2 & 9/2 \\ 0 & -3 & 1 & -3 \\ 1 & -1 & 2 & 5 \end{array}\right) \xrightarrow{\text{etc.}} \left(\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 3 \end{array}\right)$$

→ Row-reduced echelon Form

Basic Variable, Non-basic variable

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$BV = \{x_1, x_2\}$

$NBV = \{x_3\}$

Unique solution