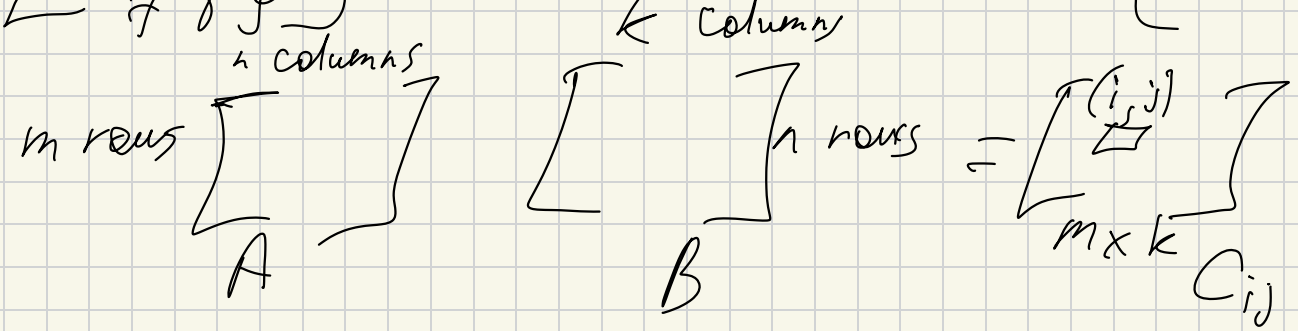
Matrices

a. Adding/Subtracting
b. Multiplying
c. Row-echelon form (ref)
d. Reduced ref (rref)
e. Inverse and rref

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$



C_{ij} = i row · j column

To multiple matrice B should have n rows

$$A_{2\times 3} = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} \quad B_{3\times 2} = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix} = \begin{bmatrix} 22 & 28 \\ 49 & 64 \end{bmatrix}_{2\times 2}$$

$C_{1,1}$ $C_{1,2}$ $C_{2,1}$ $C_{2,2}$

$1\cdot 1+2\cdot 3+3\cdot 5=22$ $\quad 1\cdot 2+2\cdot 4+3\cdot 6=28$

$4\cdot 1+5\cdot 3+6\cdot 5=49$ $\quad 4\cdot 2+5\cdot 4+6\cdot 6=64$

Row-echelon form

$$\begin{bmatrix} 1 & a & b & c \\ 0 & 1 & d & e \\ 0 & 0 & 1 & f \end{bmatrix}$$ ref

Reduced ref is when you have ref and other only 0. $\begin{bmatrix} 1 & 0 & 0 & a \\ 0 & 1 & 0 & b \\ 0 & 0 & 1 & c \end{bmatrix}$

$$\left[\begin{array}{c|c} A_n & I_n \end{array}\right] \quad \left[\begin{array}{c|c} 1\,0\,0 & \\ 0\,1\,0 & \\ 0\,0\,1 & \end{array}\right]$$

$$\downarrow$$

$$\left[\begin{array}{c|c} I_n & B_n \end{array}\right] \quad \left[\begin{array}{c|c} 1\,0\,0 & \\ 0\,1\,0 & \\ 0\,0\,1 & \end{array}\right]$$

$$A_n B_n = I_n$$

$$B_n = A^{-1}$$

$$A \cdot A^{-1} = I$$