Lecture 19

→ Formula for det A (n! terms).

→ Cofactor formula

→ Tri diagonal matrices

$$\det A = \sum_{n! \text{ terms}} \pm a_{1\alpha} \, a_{2\beta} \, a_{3\gamma} \cdots a_{n\omega}$$

$(\alpha, \beta, \gamma \cdots \omega) = $ Permutation of $(1, 2 \cdots n)$

⇒ Cofactor is a way to connect a $n \times n$ determinant to $(n-1) \times (n-1)$ determinant

$$\text{Cofactor of } a_{ij} = \pm \det \begin{pmatrix} n-1 \text{ matrix} \\ \text{with row } i \\ \text{and col } j \text{ erased} \end{pmatrix}$$

$$= C_{ij}$$

$$\longrightarrow \begin{array}{l} + \text{ if } \quad i+j = \text{even} \\ - \text{ if } \quad i+j = \text{odd} \end{array}$$

$$\boxed{\det A = a_{11} C_{11} + a_{12} C_{12} + \cdots + a_{1n} C_{1n}}$$

$\{$ along row 1 $\}$