



## Linear Algebra - Part 49

Triangular matrix:

$$\det \begin{pmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ & a_{22} & \dots & \\ & & a_{33} & \dots \\ 0 & & & a_{nn} \end{pmatrix} = a_{11} \cdot a_{22} \cdots a_{nn}$$

Block matrices:

$$\begin{pmatrix} a_{11} & \dots & a_{1m} & b_{11} & b_{12} & \dots & b_{1k} \\ \vdots & & \vdots & \vdots & \vdots & & \vdots \\ a_{m1} & \dots & a_{mm} & b_{m1} & b_{m2} & \dots & b_{mk} \\ 0 & \dots & 0 & c_{11} & c_{12} & \dots & c_{1k} \\ \vdots & & \vdots & \vdots & \vdots & & \vdots \\ 0 & \dots & 0 & c_{k1} & \dots & & c_{kk} \end{pmatrix} = \begin{pmatrix} A & B \\ 0 & C \end{pmatrix}$$

$$\Rightarrow \det \begin{pmatrix} A & B \\ 0 & C \end{pmatrix} = \det(A) \cdot \det(C)$$

Proposition:  $\det(A^T) = \det(A)$

Proposition:  $A, B \in \mathbb{R}^{n \times n}$ :  $\det(A \cdot B) = \det(A) \cdot \det(B)$  multiplicative map

If  $A$  is invertible, then:  $\det(A^{-1}) = \frac{1}{\det(A)}$

$$\det(A^{-1} B A) = \det(B)$$