A $m \times m$

B $m \times m$

C $m \times m$

$$B \cdot A = A \cdot B = I_m$$

$$C \cdot A = A \cdot C = I_m$$

$$C = C \cdot I_m = C \cdot (A \cdot B) = (C \cdot A) \cdot B = I_m \cdot B = B$$

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

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

$$= B^{-1}B = I_m \qquad (A \cdot B)^{-1} =$$

$$\left(A^{-1}\right)^{T} \cdot A^{T} = \left(A \cdot A^{-1}\right)^{T} = I_m$$

$$\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} \rightarrow \begin{pmatrix} 2 & 4 \\ 3 & 4 \end{pmatrix}$$

A B

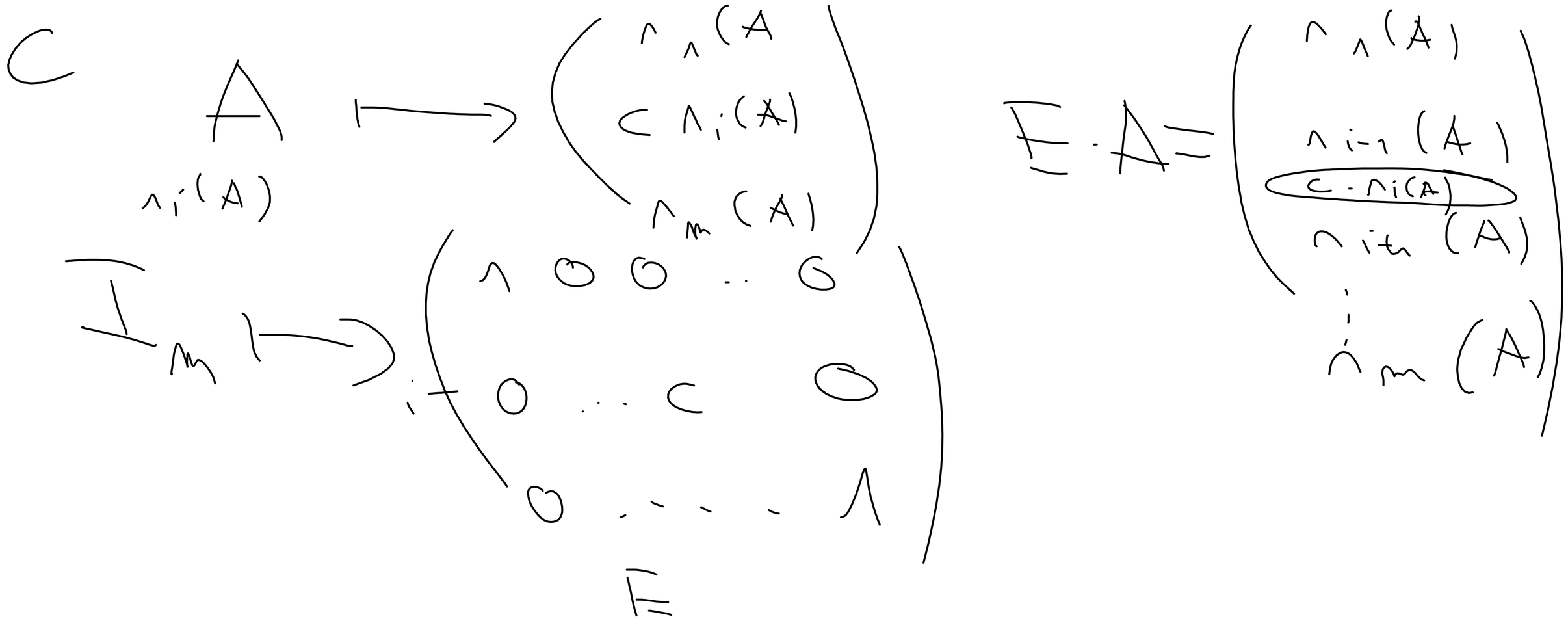
$E \cdot A =$

$$\begin{pmatrix} 2 & 0 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} = \begin{pmatrix} 2 & 4 \\ 3 & 4 \end{pmatrix}$$

$c = 2$

$$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \rightarrow \begin{pmatrix} 2 & 0 \\ 0 & 1 \end{pmatrix}$$

E



$$\left(\begin{array}{cc|cc} 1 & 2 & 1 & 0 \\ 3 & 4 & 0 & 1 \end{array}\right) \overset{1\cdot(-3)+2.}{\sim} \left(\begin{array}{cc|cc} 1 & 2 & 1 & 0 \\ 0 & -2 & -3 & 1 \end{array}\right) \cdot\left(-\frac{1}{2}\right)$$

$$\sim \left(\begin{array}{cc|cc} 1 & 0 & -2 & 1 \\ 0 & 1 & \frac{3}{2} & -\frac{1}{2} \end{array}\right) \overset{1\cdot(-2)}{} \left(\begin{array}{cc} 1 & 0 \\ 0 & 1 \end{array}\right) L$$

$A \cdot B = I_m$

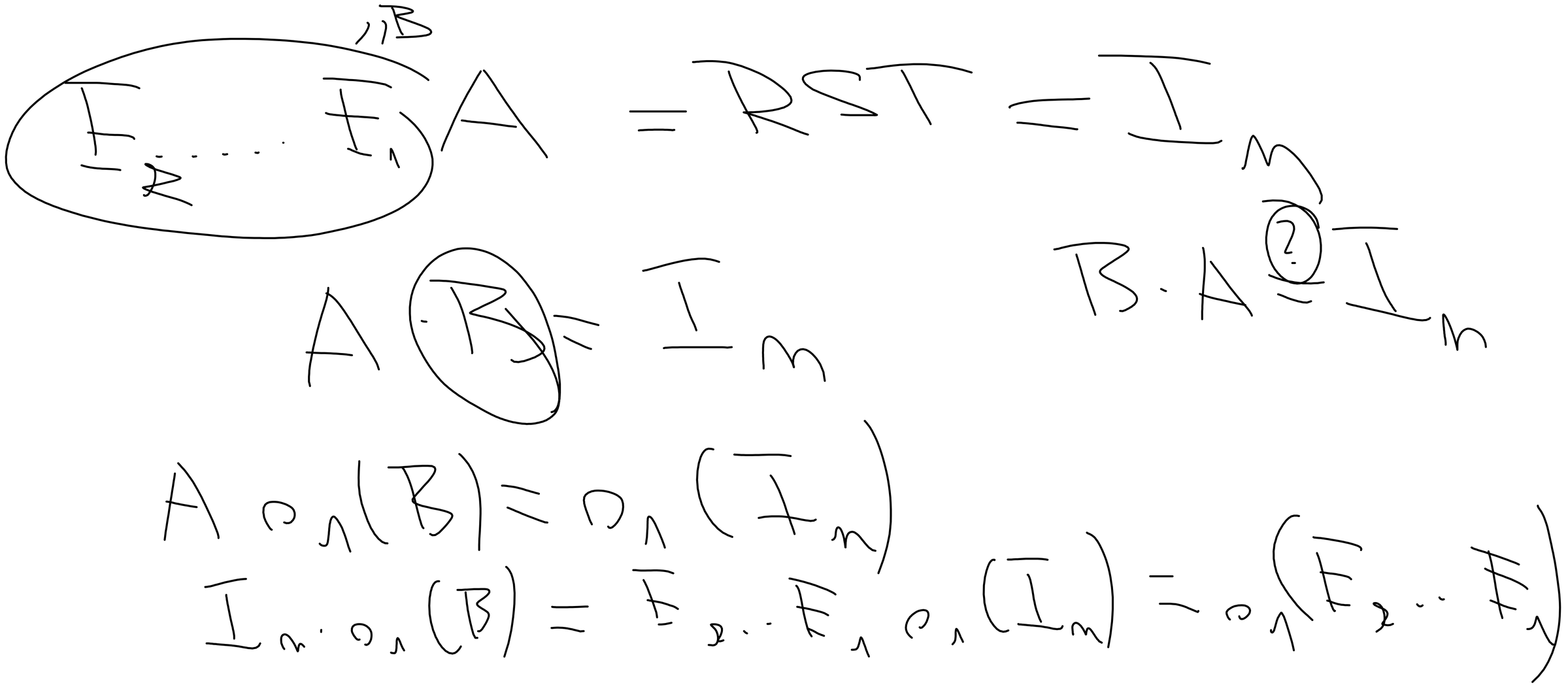
$B \cdot A = I_m$

$\downarrow$ RST

$$A \cdot c_1(B) = c_1(I_m)$$

$$\vdots \qquad \vdots$$

$$A \cdot c_n(B) = c_n(I_m)$$


B
$E_k \cdots E_1 A = RST = I_n$
$AB = I_n$
$B \cdot A \stackrel{?}{=} I_n$
$A \sigma_1(B) = \sigma_1(I_n)$
$I_n \cdot \sigma_1(B) = E_k \cdots E_1 \sigma_1(I_n) = \sigma_1(E_k \cdots E_1)$

$$\begin{pmatrix} \#C & 0 \\ 0 & 1 \end{pmatrix} \quad \begin{pmatrix} C^{-1} & 0 \\ 0 & 1 \end{pmatrix} \quad (E_1)^{-1} \cdots (E_k)^{-1}$$

$$\in : \mathbb{Z}\tilde{E} \to M\tilde{E}' \qquad E_1^{-1} \cdots E_k^{-1}$$

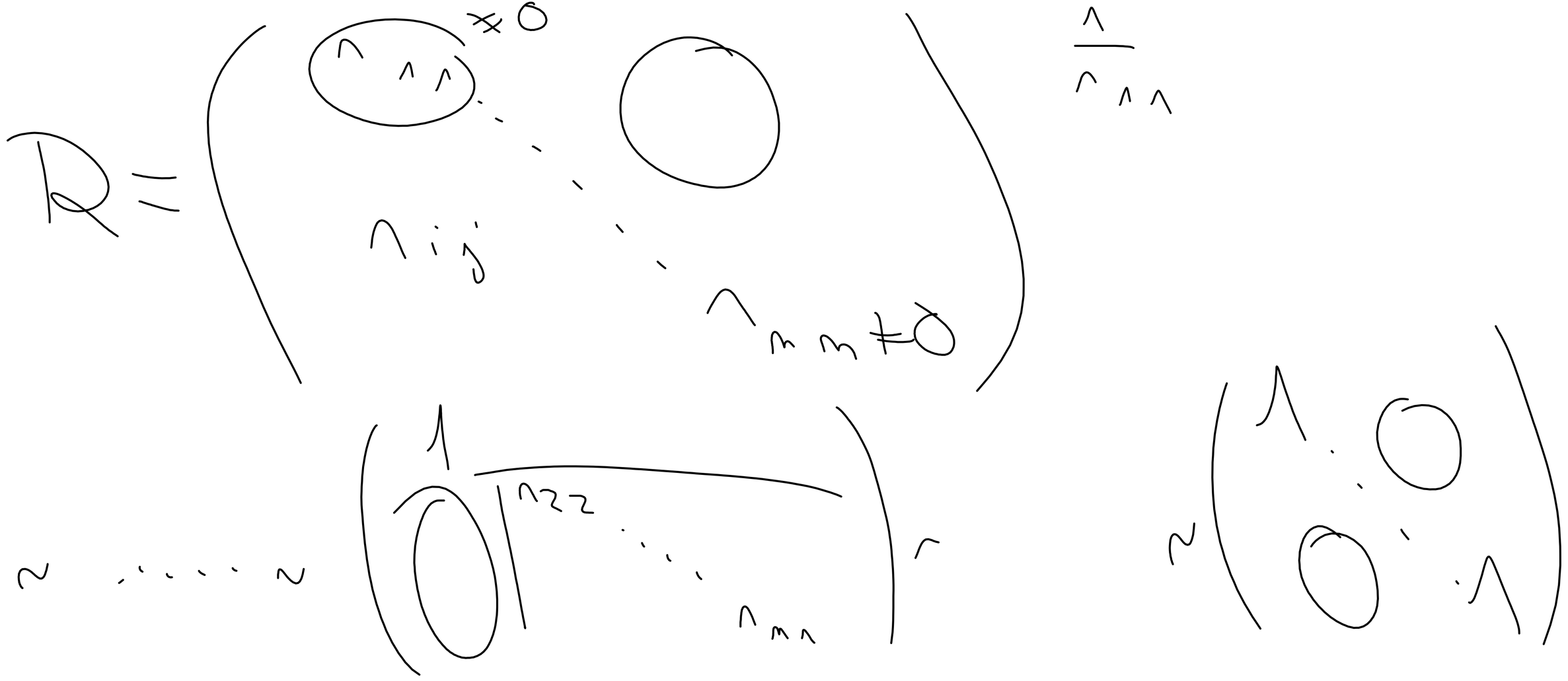
$$A \text{ is } \sim \Rightarrow A^{-1}$$

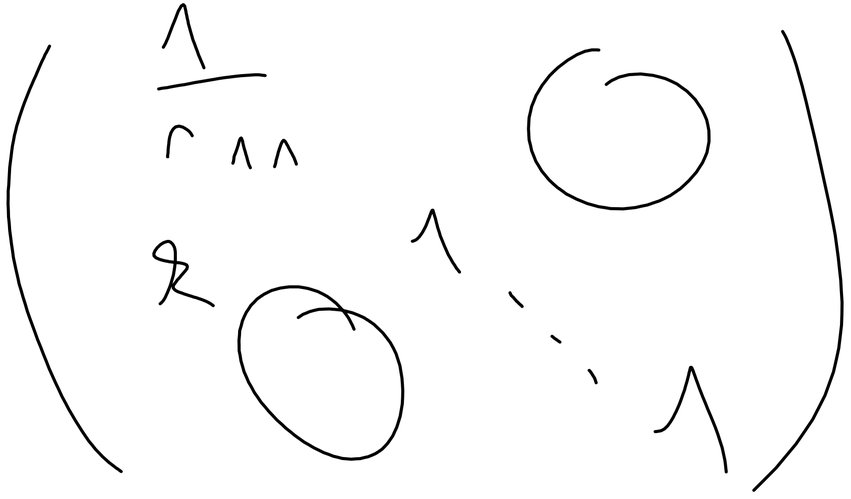
$$A = (A^{-1})^{-1} = (E_k \cdots E_1)^{-1}$$

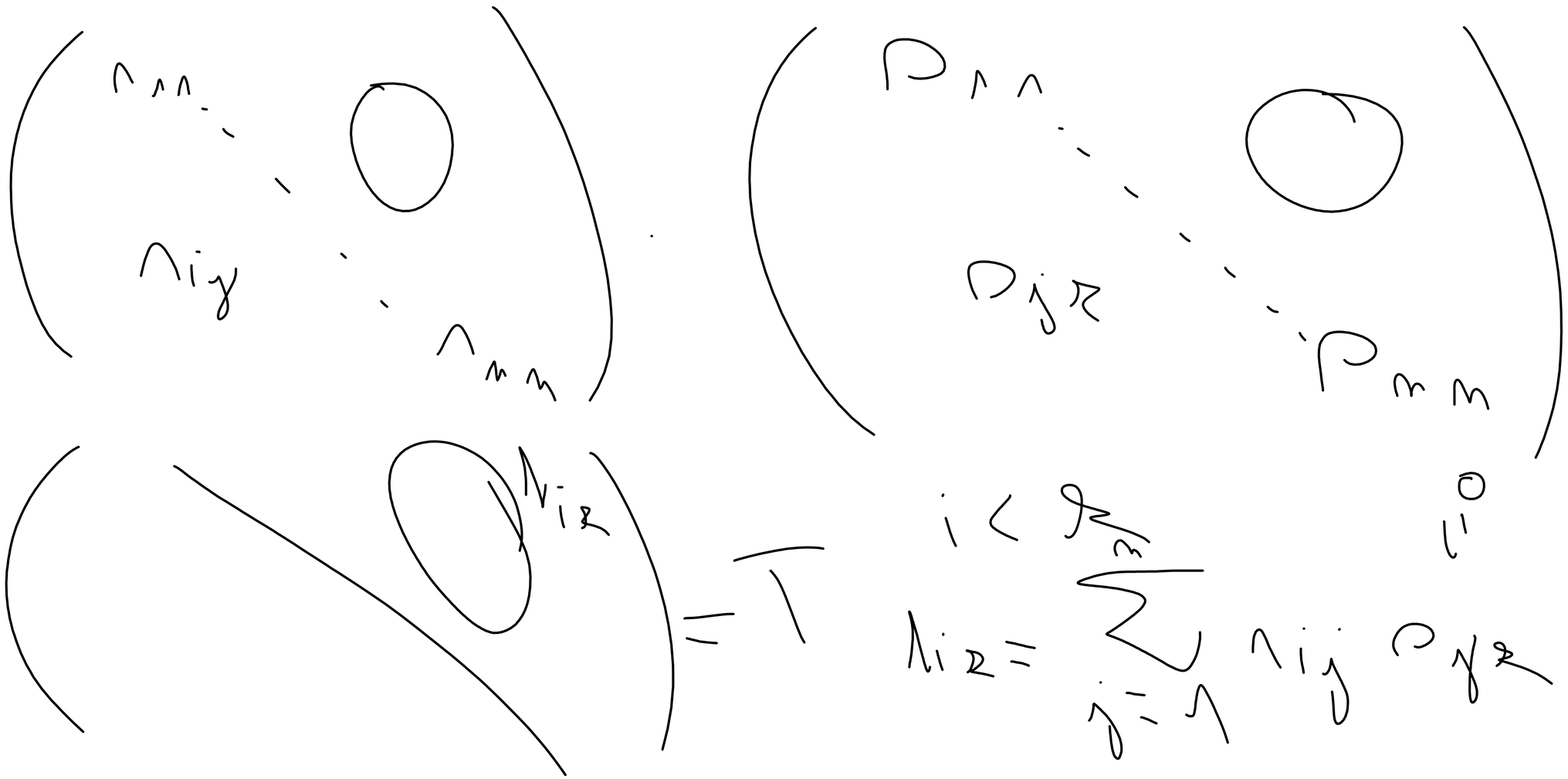
$$A \sim B$$

$$(E_k \cdots E_2 E_1) B = A$$

$$P \text{ nos.}$$







$$\lambda_{ii} = \sum_{j=1}^{n} p_{ij} \wedge j_i$$

$j < i$

$= 0$

$j > i$

$= 0$

$j = i$

$\lambda_{ii} = \sigma_{ii} \wedge_{ii}$

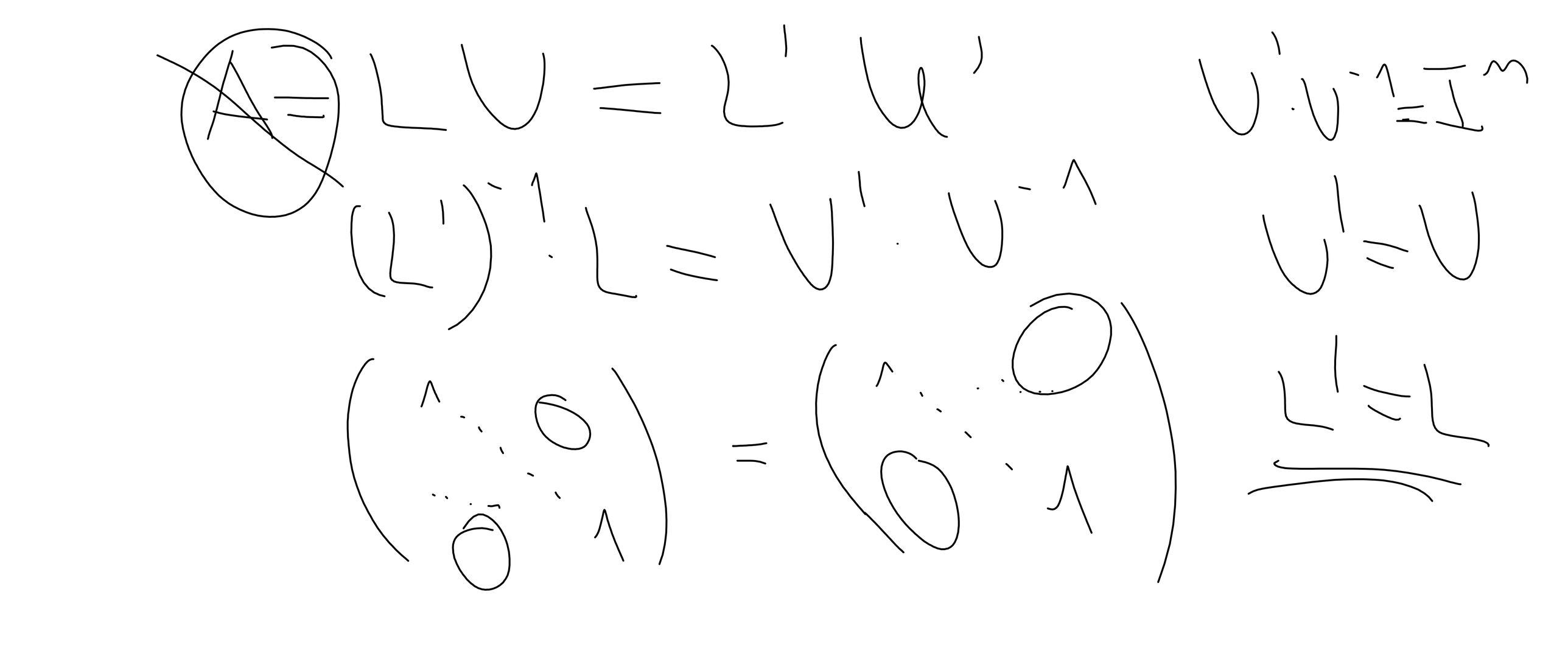
$\neq 0 \quad \neq 0 \quad \neq 0$

$$A \sim \dots \sim U = \begin{pmatrix} \ddots & \neq 0 \\ 0 & \ddots \end{pmatrix}$$

$$RA = U \qquad R^{-1}$$

dN hN L

$$A = R^{-1} U$$



$$\left(\begin{array}{ccc|ccc} 2 & -1 & 1 & 1 & 0 & 0 \\ 4 & 1 & -1 & 0 & 1 & 0 \\ -2 & 2 & 1 & 0 & 0 & 1 \end{array}\right) \sim \left(\begin{array}{ccc|ccc} 2 & -1 & 1 & 1 & 0 & 0 \\ 0 & 3 & -3 & -2 & 1 & 0 \\ 0 & 1 & 2 & 1 & 0 & 1 \end{array}\right)$$

$\sim$ A

$$\sim \left(\begin{array}{ccc|ccc} 2 & -1 & 1 & 1 & 0 & 0 \\ 0 & 3 & -3 & -2 & 1 & 0 \\ 0 & 0 & 3 & \frac{5}{3} & -\frac{1}{3} & 1 \end{array}\right)$$

$\sim$ U $\sim$ R

$R \cdot A = U$