

GAUSS ELIMINATION METHOD

GAUSS-JORDAN METHOD

Example Given a set of 3 eqs:

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{Bmatrix} x_1 \\ x_2 \\ x_3 \end{Bmatrix} = \begin{Bmatrix} b_1 \\ b_2 \\ b_3 \end{Bmatrix}$$

The method is the same as Gauss elimination with further reduction the set into eqs. to the form

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{Bmatrix} x_1 \\ x_2 \\ x_3 \end{Bmatrix} = \begin{Bmatrix} b'_1 \\ b'_2 \\ b'_3 \end{Bmatrix} \text{ to give } \begin{Bmatrix} x_1 \\ x_2 \\ x_3 \end{Bmatrix} = \begin{Bmatrix} b'_1 \\ b'_2 \\ b'_3 \end{Bmatrix}$$

ກຳນົດໄດ້ເປັນໄວ້

$$\begin{array}{l} E_1 \rightarrow E_2 \rightarrow E_3 \\ a_{21} \rightarrow a_{31} \rightarrow a_{32} \\ E_4 \rightarrow E_5 \rightarrow E_6 \\ a_{23} \rightarrow a_{13} \rightarrow a_{12} \end{array}$$

$$\left[\begin{array}{ccc|c} a_{11} & a_{12} & a_{13} & b_1 \\ a_{21} & a_{22} & a_{23} & b_2 \\ a_{31} & a_{32} & a_{33} & b_3 \end{array} \right]$$

Example with 3 eqs:

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{Bmatrix} x_1 \\ x_2 \\ x_3 \end{Bmatrix} = \begin{Bmatrix} b_1 \\ b_2 \\ b_3 \end{Bmatrix}$$

F, E, E, A

(1) Forward Elimination

$$\begin{array}{l} (1)/a_{11} \\ (1)-(2) \end{array} \quad \begin{bmatrix} 1 & a_{12} & a_{13} \\ 0 & a_{22} & a_{23} \\ 0 & a'_{32} & a'_{33} \end{bmatrix} \begin{Bmatrix} x_1 \\ x_2 \\ x_3 \end{Bmatrix} = \begin{Bmatrix} b_1 \\ b'_2 \\ b''_3 \end{Bmatrix}$$

Back Substitution

$$x_3 = b''_3 / a'_{33}$$

$$x_2 = (b'_2 - a'_{23}x_3) / a'_{22}$$

$$x_1 = (b_1 - a'_{12}x_2 - a'_{13}x_3) / a'_{11}$$

$$\Rightarrow \begin{array}{l} (1)/a_{11} \\ (2)/a'_{22} \\ (3)/a''_{33} \end{array} \left[\begin{array}{ccc|c} 1 & 0 & 0 & b'_1 \\ 0 & 1 & 0 & b'_2 \\ 0 & 0 & 1 & b''_3 \end{array} \right]$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$$

$$\frac{(E_1)}{a_{21}} \rightarrow \frac{(E_2)}{a_{31}} \rightarrow \frac{(E_3)}{a_{32}}$$

→

$$\left[\begin{array}{ccc} a''_{11} & 0 & 0 \\ 0 & a''_{22} & 0 \\ 0 & 0 & a''_{33} \end{array} \right]$$

$$a_{23} \rightarrow a_{13} \rightarrow a_{12}$$

Matrix inversion

[ဉာဏ် ကော်စုစုပေါင်း]

$$A^{-1} \cdot A = I \quad I = \text{matrix identity}$$

$$A^{-1} A x = A^{-1} B$$

$$I x = A^{-1} B$$

$$x = A^{-1} B$$

1. မျှမှု၊ I

2. ပေါ် A ရှိနိုင်

3. နှေ့ တဲ့ I

$$\varepsilon_1, \varepsilon_2, \varepsilon_3 \cdot A = I$$

$$\varepsilon_1, \varepsilon_2, \varepsilon_3 \cdot A \cdot A^{-1} = I \cdot A^{-1}$$

$$\varepsilon_1, \varepsilon_2 \cdot I = A^{-1}$$

Compute A^{-1} if

$$A = \begin{bmatrix} 1 & 4 & 3 \\ -1 & -2 & 2 \\ 2 & 2 & 3 \end{bmatrix}$$

$E_1 E_2 A$

Solution

$$\begin{array}{c} A \quad | \quad I \\ \left[\begin{array}{ccc|ccc} 1 & 4 & 3 & 1 & 0 & 0 \\ -1 & -2 & 0 & 0 & 1 & 0 \\ 2 & 2 & 3 & 0 & 0 & 1 \end{array} \right] \rightarrow \left[\begin{array}{ccc|ccc} 1 & 4 & 3 & 1 & 0 & 0 \\ 0 & 2 & 3 & 0 & 1 & 0 \\ 0 & -6 & -3 & -2 & 1 & 0 \end{array} \right] \\ \left[\begin{array}{ccc|ccc} 1 & 4 & 3 & 1 & 0 & 0 \\ 0 & 2 & 3 & 0 & 1 & 0 \\ 0 & 0 & 6 & 1 & 3 & 1 \end{array} \right] \rightarrow \left[\begin{array}{ccc|ccc} 1 & 4 & 0 & \frac{1}{2} & -\frac{3}{2} & -\frac{1}{2} \\ 0 & 2 & 0 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 0 & 6 & 1 & 3 & 1 \end{array} \right] \\ \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} \\ 0 & 0 & 6 & 1 & 3 & 1 \end{array} \right] \rightarrow \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} \\ 0 & 0 & 6 & 1 & 3 & 1 \end{array} \right] \\ \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} \\ 0 & 0 & 6 & 1 & 3 & 1 \end{array} \right] \rightarrow \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} \\ 0 & 0 & 6 & 1 & 3 & 1 \end{array} \right] \end{array}$$

အော် A⁻¹ ရှိခြင်း



Ex

$$\begin{bmatrix} 4 & -4 & 0 \\ -1 & 4 & -2 \\ 0 & -2 & 4 \end{bmatrix} \begin{Bmatrix} x_1 \\ x_2 \\ x_3 \end{Bmatrix} = \begin{Bmatrix} 400 \\ 400 \\ 400 \end{Bmatrix}$$

ห้าม - เก็บตัวอยู่ในตัวเดียว (= ห้าม)

- ค่าคงที่

950

350

275

#1 รูปที่ 1

$$\begin{array}{c|ccc|c|c|c} & 4 & -4 & 0 & x_1 & | & 400 \\ \textcircled{-1} & 4 & -2 & & x_2 & | & 400 \\ & 0 & -2 & 4 & x_3 & | & 400 \end{array}$$

* 1. $\frac{\textcircled{1}}{4} = \begin{bmatrix} 1 & -1 & 0 \end{bmatrix} \begin{bmatrix} 100 \end{bmatrix}$

$$\begin{array}{c|ccc|c|c|c} & 1 & -1 & 0 & x_1 & | & 100 \\ \textcircled{-1} & -1 & 1 & 0 & x_2 & | & -100 \\ & 0 & 3 & -2 & x_3 & | & 500 \end{array}$$

$$\begin{array}{c|ccc|c|c|c} & -1 & 1 & 0 & x_1 & | & 100 \\ \textcircled{0} & 3 & -2 & & x_2 & | & -100 \\ & 0 & -2 & 4 & x_3 & | & 500 \end{array}$$

$$R_2' = \frac{R_2 - R_1(-1)}{4} = \frac{(-1) - (4(-1))}{4}$$

$$= \begin{bmatrix} 4 & -4 & 0 \\ 0 & 3 & -2 \\ 0 & -2 & 4 \end{bmatrix} \begin{bmatrix} 400 \\ 500 \\ 400 \end{bmatrix}$$

ห้าม #2

* 2.

$\textcircled{2} = \begin{bmatrix} 0 & 1 & -\frac{2}{3} \end{bmatrix} \begin{bmatrix} \frac{500}{3} \end{bmatrix}$

$\textcircled{3} = \begin{bmatrix} 0 & -2 & -4 \end{bmatrix} \begin{bmatrix} 400 \end{bmatrix}$

$\textcircled{2} = 0 \cdot -2 = \begin{bmatrix} 0 & -2 & \frac{4}{3} \end{bmatrix} \begin{bmatrix} \frac{1000}{3} \end{bmatrix}$

$\textcircled{3} = \begin{bmatrix} 0 & 0 & -\frac{16}{3} \end{bmatrix} \begin{bmatrix} \frac{2200}{3} \end{bmatrix}$

$$\begin{bmatrix} 4 & -4 & 0 \\ 0 & 3 & \textcircled{-2} \\ 0 & 0 & -\frac{16}{3} \end{bmatrix} \begin{bmatrix} 400 \\ 500 \\ \frac{2200}{3} \end{bmatrix}$$

#3, ห้าม

$\textcircled{3} = \begin{bmatrix} 0 & 0 & -\frac{16}{3} \end{bmatrix} \begin{bmatrix} \frac{2200}{3} \end{bmatrix}$

$\textcircled{2} = \begin{bmatrix} 0 & 3 & -2 \end{bmatrix} \begin{bmatrix} 500 \end{bmatrix}$

$\textcircled{2} = \begin{bmatrix} 0 & 0 & -2 \end{bmatrix} \begin{bmatrix} 275 \end{bmatrix}$

$\textcircled{1} = \begin{bmatrix} 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} -\frac{275}{2} \end{bmatrix}$

$\textcircled{1} = \begin{bmatrix} 0 & 3 & 0 \end{bmatrix} \begin{bmatrix} 225 \end{bmatrix}$

$\textcircled{1} = 0 \cdot -2 = \begin{bmatrix} 0 & 0 & -2 \end{bmatrix} \begin{bmatrix} 275 \end{bmatrix}$

(2)

$$\left[\begin{array}{ccc} 4 & -4 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & \frac{16}{3} \end{array} \right] \quad \left[\begin{array}{c} 400 \\ 225 \\ \frac{2200}{3} \end{array} \right]$$

①'

解き方

$$\underline{\textcircled{2}} = [0 \ 1 \ 0] [75]$$

$$\textcircled{3} = [-4 \ 0] [-300]$$

$$\begin{aligned} \textcircled{1} &= [4 \ -4 \ 0] [400] \\ \textcircled{2} &= [0 \ -4 \ 0] [-300] \\ \textcircled{3} &= [4 \ 0 \ 0] [700] \end{aligned}$$

$$\left[\begin{array}{ccc} 4 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & -\frac{16}{3} \end{array} \right] \quad \left[\begin{array}{c} 700 \\ 225 \\ \frac{2200}{3} \end{array} \right]$$

↓

$$\begin{array}{r} \textcircled{1} \\ \textcircled{2} \\ \textcircled{3} \\ \textcircled{4} \end{array} \left[\begin{array}{ccc} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{array} \right] \left[\begin{array}{c} \times \\ y \\ z \end{array} \right] \left[\begin{array}{c} 175 \\ 75 \\ -\frac{275}{2} \end{array} \right]$$

$$\begin{array}{l|l|l} 0x + 0y + 1z & = -\frac{275}{2} & 0x + 1y + 0z = 75 & 1x + 0y + 0z = 175 \\ z = \frac{-275}{2} & & y = 75 & x = 175 \end{array}$$

Matrix inversion

[ဉာဏ် ကော်စုစုပေါင်း]

$$A^{-1} \cdot A = I \quad I = \text{matrix identity}$$

$$A^{-1} A x = A^{-1} B$$

$$I x = A^{-1} B$$

$$x = A^{-1} B$$

1. မျှမှု A , I

2. ပေါ် A ရှိနိုင်

$$\left[\begin{array}{ccc|ccc} 1 & 4 & 3 & 1 & 0 & 0 \\ -1 & -2 & 0 & 0 & 1 & 0 \\ 2 & 2 & 3 & 0 & 0 & 1 \end{array} \right] \rightarrow \left[\begin{array}{ccc|ccc} 1 & 4 & 3 & 1 & 0 & 0 \\ 0 & 2 & -3 & -2 & 1 & 0 \\ 0 & 0 & 6 & -2 & 0 & 1 \end{array} \right]$$

$$\rightarrow \left[\begin{array}{ccc|ccc} 1 & 4 & 3 & 1 & 0 & 0 \\ 0 & 2 & 0 & 0 & 1 & 0 \\ 0 & 0 & 6 & 1 & 3 & 1 \end{array} \right] \rightarrow \left[\begin{array}{ccc|ccc} 1 & 4 & 0 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 2 & 0 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 0 & 6 & 1 & 3 & 1 \end{array} \right]$$

$$\rightarrow \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} \\ 0 & 0 & 6 & 1 & 3 & 1 \end{array} \right] \rightarrow \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} \\ 0 & 0 & 1 & \frac{1}{6} & \frac{1}{2} & \frac{1}{6} \end{array} \right]$$

3. $E_1 E_2 \dots E_n \cdot A = I$

$$E_n \dots E_1 \cdot A \cdot A^{-1} = I \cdot A^{-1}$$

အဲလဲ A^{-1} ဖြစ်သွားတယ်

$$E_n \dots E_1 \cdot I = A^{-1}$$

Compute A^{-1} if

$$A = \left[\begin{array}{ccc} -1 & 4 & 3 \\ -1 & -2 & 2 \\ 2 & 2 & 3 \end{array} \right]$$

$E_2 E_1 A$

Solution

$$\left[\begin{array}{ccc|ccc} 1 & 4 & 3 & 1 & 0 & 0 \\ -1 & -2 & 0 & 0 & 1 & 0 \\ 2 & 2 & 3 & 0 & 0 & 1 \end{array} \right] \rightarrow \left[\begin{array}{ccc|ccc} 1 & 4 & 3 & 1 & 0 & 0 \\ 0 & 2 & 3 & 1 & 1 & 0 \\ 0 & -6 & -3 & -2 & 0 & 1 \end{array} \right]$$

$$\rightarrow \left[\begin{array}{ccc|ccc} 1 & 4 & 0 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 2 & 0 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 0 & 6 & 1 & 3 & 1 \end{array} \right] \rightarrow \left[\begin{array}{ccc|ccc} 1 & 4 & 0 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 2 & 0 & \frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 0 & 6 & 1 & 3 & 1 \end{array} \right]$$

$$\rightarrow \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} \\ 0 & 0 & 1 & \frac{1}{6} & \frac{1}{2} & \frac{1}{6} \end{array} \right]$$

$\{X\}$

$$\begin{bmatrix} 4 & -4 & 0 \\ -1 & 4 & -2 \\ 0 & -2 & 4 \end{bmatrix} \begin{Bmatrix} x_1 \\ x_2 \\ x_3 \end{Bmatrix} = \begin{Bmatrix} 400 \\ 400 \\ 400 \end{Bmatrix}$$

A

$$= \begin{bmatrix} 4 & -4 & 0 \\ -1 & 4 & -2 \\ 0 & -2 & 4 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

A

I

equivalent

$$\begin{bmatrix} 4 & -4 & 0 \\ -1 & 4 & -2 \\ 0 & -2 & 4 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\#1 \quad \textcircled{1} = \frac{1}{4} \Rightarrow \left[1 \quad -1 \quad 0 \right] \left[\frac{1}{4} \quad 0 \quad 0 \right] \quad \parallel \quad \textcircled{1} + \textcircled{2} \quad \left[-1 \quad 4 \quad -2 \right] + \left[1 \quad -1 \quad 0 \right] + \left[\frac{1}{4} \quad 0 \quad 0 \right] +$$

$\textcircled{2} = [0 \quad 3 \quad -2] \quad \left[\frac{1}{4} \quad 1 \quad 0 \right]$

$$= \begin{bmatrix} 4 & -4 & 0 \\ 0 & 3 & -2 \\ 0 & -2 & 4 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ \frac{1}{4} & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\#2 \quad \textcircled{1} = \frac{2}{3} \Rightarrow \left[0 \quad 1 \quad -\frac{2}{3} \right] \left[\frac{1}{2} \quad \frac{1}{3} \quad 0 \right] \quad \parallel \quad \textcircled{1} + \textcircled{2} \quad \left[0 \quad -2 \quad 4 \right] \left[0 \quad 0 \quad 1 \right] +$$

$\textcircled{2} = \left[0 \quad 2 \quad \frac{4}{3} \right] \left[\frac{1}{6} \quad \frac{2}{3} \quad 0 \right] \quad \textcircled{3} = \left[0 \quad 0 \quad \frac{16}{3} \right] \left[\frac{1}{6} \quad \frac{2}{3} \quad 1 \right]$

$$\begin{bmatrix} 4 & -4 & 0 \\ 0 & 3 & -2 \\ 0 & 0 & \frac{16}{3} \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ \frac{1}{4} & 1 & 0 \\ \frac{1}{6} & \frac{2}{3} & 1 \end{bmatrix}$$

$$\#3 \quad \textcircled{1} = \left[0 \quad 0 \quad 1 \right] \left[\frac{1}{32} \quad \frac{1}{8} \quad \frac{3}{16} \right] \quad \parallel \quad \textcircled{1} + \textcircled{2} \quad \left[0 \quad 3 \quad -2 \right] \left[\frac{1}{4} \quad 1 \quad 0 \right] +$$

$\textcircled{2} = \left[0 \quad 0 \quad 2 \right] \left[\frac{1}{16} \quad \frac{1}{4} \quad \frac{3}{8} \right] \quad \textcircled{3} = \left[0 \quad 3 \quad 0 \right] \left[\frac{5}{16} \quad \frac{5}{4} \quad \frac{3}{8} \right]$

$$\left[\begin{array}{ccc} 4 & -4 & 0 \\ 0 & 3 & 0 \\ \hline 0 & 0 & \frac{16}{3} \end{array} \right] \quad \left[\begin{array}{ccc} 1 & 0 & 0 \\ \frac{5}{16} & \frac{5}{4} & \frac{1}{3} \\ \frac{1}{6} & \frac{2}{3} & 1 \end{array} \right]$$

$$\#4 \quad \textcircled{2} = \frac{1}{3} \quad [0 \ 1 \ 0]$$

$$\left[\begin{array}{ccc} \frac{5}{48} & \frac{5}{12} & \frac{1}{8} \end{array} \right]$$

$$\textcircled{1} + (\textcircled{4} - \textcircled{2}) \quad [0 \ 0 \ 0]$$

$$[1 \ 0 \ 0] \quad \left[\begin{array}{ccc} \frac{5}{12} & \frac{5}{3} & \frac{1}{2} \end{array} \right]^+$$

$$\textcircled{2} - \textcircled{4} = [0 \ 4 \ 0]$$

$$\left[\begin{array}{ccc} \frac{5}{12} & \frac{5}{3} & \frac{1}{2} \end{array} \right]$$

$$\textcircled{1} = [4 \ 0 \ 0] \quad \left[\begin{array}{ccc} \frac{17}{12} & \frac{5}{3} & \frac{1}{2} \end{array} \right]$$

$$\left[\begin{array}{ccc} \textcircled{4} & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & \frac{16}{3} \end{array} \right] \quad \left[\begin{array}{ccc} \frac{17}{12} & \frac{5}{3} & \frac{1}{2} \\ \frac{5}{16} & \frac{5}{4} & \frac{3}{8} \\ \frac{1}{6} & \frac{2}{3} & 1 \end{array} \right]$$

$$\textcircled{1} = [1 \ 0 \ 0] \quad \left[\begin{array}{ccc} \frac{17}{48} & \frac{5}{12} & \frac{1}{8} \end{array} \right]$$

$$\textcircled{2} = [0 \ 1 \ 0] \quad \left[\begin{array}{ccc} \frac{5}{48} & \frac{5}{12} & \frac{1}{8} \end{array} \right]$$

$$\textcircled{3} = [0 \ 0 \ 1] \quad \left[\begin{array}{ccc} \frac{1}{32} & \frac{1}{8} & \frac{3}{16} \end{array} \right]$$

$$= \left[\begin{array}{ccc} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{array} \right] \quad \left[\begin{array}{ccc} \frac{17}{48} & \frac{5}{12} & \frac{1}{8} \\ \frac{5}{48} & \frac{5}{12} & \frac{1}{8} \\ \frac{1}{32} & \frac{1}{8} & \frac{3}{16} \end{array} \right]$$

I

A⁻¹

$$\varepsilon_n \dots \varepsilon_1 \cdot A = I$$

กูน A⁻¹ ให้ตรวจสอบ

$$\varepsilon_n \dots \varepsilon_2 \varepsilon_1 \cdot A \cdot A^{-1} = I \cdot A^{-1} = I$$

$$\varepsilon_n \dots \varepsilon_1 \cdot I = A^{-1}$$

$$\varepsilon_n \dots \varepsilon_2 \varepsilon_1 \cdot I = A^{-1}$$

$$\varepsilon_1 \quad \varepsilon_2 \quad \varepsilon_3$$

$$\varepsilon_4 \quad \varepsilon_5 \quad \varepsilon_6$$

$$a_{23} \quad a_{31} \quad a_{12}$$

/

$$= \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} \frac{1}{4} & \frac{5}{12} & \frac{1}{8} \\ \frac{5}{12} & \frac{5}{12} & \frac{1}{8} \\ \frac{1}{8} & \frac{1}{8} & \frac{3}{16} \end{bmatrix}$$

I

A^{-1}

$$\begin{bmatrix} 4 & -4 & 0 \\ -1 & 4 & -2 \\ 0 & -2 & 4 \end{bmatrix}$$

$$\varepsilon_n \dots \varepsilon_2 \varepsilon_1 \cdot A = I$$

กูน A^{-1} ให้ตรวจสอบ

$$\varepsilon_n \dots \varepsilon_2 \varepsilon_1 \cdot A \cdot A^{-1} = I \cdot A^{-1}$$

I

$$= \varepsilon_n \dots \varepsilon_2 \varepsilon_1 \cdot A = I$$

$$\varepsilon_n \dots \varepsilon_2 \varepsilon_1 \cdot I = A^{-1}$$