$$(1, 1), (2, 1), (3, 2), (4, 2),$$

$$(5, 3) = | 2| 1 M 3 3 2.$$

$$(5, 3) = | 2| 1 M 3 3 2.$$

$$(5, 3) = | 3| 1 M 3 3 2.$$

$$\begin{pmatrix} \beta_0 \\ \beta_1 \end{pmatrix} = \begin{pmatrix} \zeta_1 \\ \zeta_2 \\ \zeta_3 \end{pmatrix}$$

$$\begin{pmatrix} \beta_0 \\ \beta_1 \end{pmatrix} = \begin{pmatrix} 1 \\ \frac{1}{2} \\ \frac{1}{3} \end{pmatrix}$$

$$\begin{pmatrix} \beta_0 \\ \beta_1 \end{pmatrix} = \begin{pmatrix} \frac{1}{2} \\ \frac{2}{3} \end{pmatrix}$$

$$\begin{pmatrix}
1 & 1 \\
1 & 2 \\
1 & 3 \\
1 & 4
\end{pmatrix}
\begin{pmatrix}
\beta_0 \\
\beta_1
\end{pmatrix} = \begin{pmatrix}
1 \\
2 \\
3
\end{pmatrix}$$

$$M. \qquad \beta = Z$$

$$\begin{pmatrix} \beta_0 \\ \beta_1 \end{pmatrix} = \begin{pmatrix} \frac{1}{2} \\ \frac{2}{3} \end{pmatrix}$$

$$\begin{pmatrix} \beta_0 \\ \beta_1 \end{pmatrix} = \begin{pmatrix} 1 \\ \frac{1}{2} \\ \frac{1}{8} \end{pmatrix}$$

$$\left(\begin{array}{c}
3 \\
4 \\
5
\end{array}\right) = \left(\begin{array}{c}
1 \\
2 \\
3 \\
3
\end{array}\right)$$

$$\begin{pmatrix} \beta_0 \\ \beta_0 \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \end{pmatrix}$$

$$l = \beta_0 + \beta_1 \cdot 1 + \epsilon_1$$

 $l = \beta_0 + \beta_1 \cdot 2 + \epsilon_2$

$$1 = \beta_0 + \beta_1 \cdot 2 + \epsilon_2$$

$$2 = \beta_0 + \beta_1 \cdot 3 + \epsilon_3$$

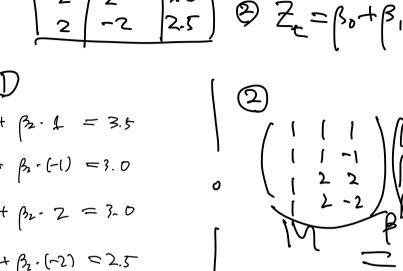
$$2 = \beta_0 + \beta_1 \cdot 4 + \epsilon_4$$

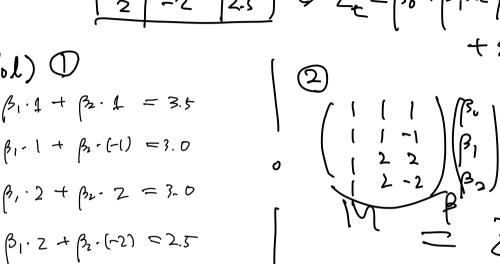
 $3 = \beta_0 + \beta_1 \cdot 5 + \epsilon_5$

M.
$$\beta = \chi$$
 $3 = \beta_0 + \beta_1 \cdot 5 + \epsilon_5$

MTM $\beta = M^T Z \Rightarrow \beta = (M^T M)^T M^T Z$

Kt= B, X++B2y++E





$$\Sigma = \begin{pmatrix} \xi_1 \\ \xi_2 \\ \\ \xi_1 \end{pmatrix} \quad \text{Man} \quad \text{And} \quad \begin{cases} E(\xi_1) = 0, \\ Var(\xi_2) = T_2^2 \\ Var(\xi_1) = T_2^2 \end{cases}$$

$$(t = 1, 2, ..., N)$$

$$= 0.$$

$$\begin{cases} \text{Cov}(X, Y) := E[(X - Y)(Y - Y)] \\ \text{Cov}(X, Y) := E[(X - X)(Y - Y)]
\end{cases}$$

$$\begin{cases} E[XY] = E[XY] + XY \\ Y_1 - Y \\ Y_2 - X \end{cases}$$

$$\begin{cases} X_1 - X \\ Y_2 - Y \\ Y_3 - Y \end{cases}$$

$$\begin{cases} X_1 - X \\ Y_2 - Y \\ Y_3 - Y \end{cases}$$

$$\begin{cases} X_1 - X \\ Y_2 - Y \\ Y_3 - Y \end{cases}$$

$$\begin{cases} X_1 - X \\ Y_2 - Y \\ Y_3 - Y \end{cases}$$

$$\begin{cases} E[XY] - XY - XY + XY \\ Y_3 - Y \\ Y_3 - Y \end{cases}$$

$$\begin{cases} E[XY] - XY - XY + XY \\ Y_3 - Y \\ Y_4 - Y \\ Y_5 - Y \end{cases}$$

$$\begin{cases} E[XY] - XY - XY + XY \\ Y_5 - Y \\ Y_6 - Y \\ Y_6 - Y \\ Y_7 - Y \\ Y_8 - Y \end{cases}$$

$$\begin{cases} E[XY] - XY - XY + XY \\ Y_8 - Y \\ Y_8 -$$

$$X,Y: \mathcal{E}_{A} \Rightarrow ECXY = ECXY ECYY
Cov(X,Y) = ECXY - ECXY EXY
= 0.

$$X \cup V = 0 \iff U \perp V$$

$$Z = \begin{pmatrix} \mathcal{E}_{1} \\ \mathcal{E}_{2} \\ \vdots \\ \mathcal{E}_{N} \end{pmatrix} \Rightarrow \mathcal{E}(\mathcal{E}) = \begin{pmatrix} \mathcal{E}(\mathcal{E}_{1}) \\ \mathcal{E}(\mathcal{E}_{1}) \\ \vdots \\ \mathcal{E}(\mathcal{E}_{N}) \end{pmatrix}$$

$$TUAS()$$$$

$$Cov(\Sigma) = F(\Sigma^T)$$

$$= F(\Sigma^T)$$

$$=$$

$$= E\left(\left[\xi_{t} - \overline{\xi_{t}}\right]^{2}\right)$$

$$= Var\left(\xi_{t}\right) = O_{\xi}^{2}$$

$$+ | \neq t_{2}|$$

$$= E\left(\left[\xi_{t}, \xi_{\tau_{2}}\right] - E\left(\left[\xi_{t}, -o\right]\left[\xi_{t}, -o\right]\right)\right)$$

$$= E\left(\left[\xi_{t}, -\overline{\xi_{t}}\right]\left[\xi_{t}, -\overline{\xi_{t}}\right]\right)$$

$$= Cor\left(\xi_{t}, -\overline{\xi_{t}}\right)\left[\xi_{t}, -\overline{\xi_{t}}\right]$$

$$= O_{\xi}^{2}\left[\frac{\varepsilon_{t}}{\varepsilon_{t}}\right]$$

 $E(\mathcal{E}_{t}) = E(\mathcal{E}_{t} - \mathcal{O})^{2})$

$$Z = X \beta + \underbrace{\sum_{\{z_1, z_2, \dots z_n\}} \sum_{\{x_n\}}^{z_1}}_{\{x_n\}} = z_1 + z_1 + z_2 + z_1 + z_2 + z_2$$