$$\frac{1}{2} \times \mathbb{N}(\underline{X}\underline{P}, \underline{Z}) \qquad \underline{Y} = \begin{pmatrix} y_1 \\ y_2 \\ y_3 \end{pmatrix} \underline{P} = \begin{pmatrix} p_1 \\ p_2 \\ p_3 \\ p_4 + p_1 \end{pmatrix}$$

$$\frac{X}{2} = \begin{pmatrix} 1 & X_{11} & X_{21} & \dots & X_{k_1} \\ 1 & X_{12} & X_{22} & \dots & X_{k_2} \\ 1 & X_{13} & X_{23} & \dots & X_{k_N} \end{pmatrix}$$

$$\frac{X}{2} = \begin{pmatrix} 1 & X_{11} & X_{21} & \dots & X_{k_1} \\ 1 & X_{12} & X_{22} & \dots & X_{k_N} \\ 1 & X_{13} & X_{23} & \dots & X_{k_N} \end{pmatrix}$$

$$\frac{X}{2} = \begin{pmatrix} 1 & X_{11} & X_{21} & \dots & X_{k_N} \\ 1 & X_{12} & X_{22} & \dots & X_{k_N} \\ 1 & X_{13} & X_{23} & \dots & X_{k_N} \end{pmatrix}$$

$$= -2 \begin{pmatrix} 1 & 0 \\ 0 & \dots & 0 \\ 0 & \dots & 0 \end{pmatrix}$$

$$\left(\begin{array}{c} \left(y_{,Y}, P_{,\Sigma}\right) = -\frac{n}{2} \log_{3} 2T - \frac{1}{2} \log_{3} \left(d_{0} + \left(z\right)\right) - \frac{1}{2} \left(y - x_{0}\right)^{1} \sum_{i=1}^{n} \left(y - x_{0}\right)^{i} \\
 \times -\frac{1}{2} \log_{3} \left(d_{0} + \left(\sigma^{2} I\right)\right) - \frac{1}{2} \left(y - y_{0}\right)^{1} \partial_{\sigma} I^{-1} \left(y - x_{0}\right) \\
 \times -\frac{1}{2} \log_{3} \left(\sigma^{2}\right)^{2} - \frac{\sigma^{2}}{2} \left(y - x_{0}\right)^{1} \left(y - x_{0}\right) \\
 \times -\frac{1}{2} \log_{3} \left(\sigma^{2}\right)^{2} - \frac{\sigma^{2}}{2} \left(y - x_{0}\right)^{1} \left(y - x_{0}\right)$$

The formula of the property of the property

= 1/20 30 [y'y - y'xs - bxy + p'x'xs]

= - [-/x bxy + /x/x b] = 0

$$-x^{\prime}y + x^{\prime}x \beta = 0$$

$$x' \times \rho = x' \times \gamma$$

$$(x' \times)^{-1} (x' \times) \rho = (x' \times)^{-1} (x' \times)$$

$$\hat{\rho} = (x' \times)^{-1} x' \times \gamma$$

$$(x'x)^{-1} (x'x) P = (x'x)^{-1} (x'y)$$

$$\hat{P}_{rle} = (x'x)^{-1} x'y$$

$$\hat{Y} = x \hat{P}_{mle} = x (x'x)^{-1} x'y$$

$$\frac{\int \ell(\cdot)}{\int \sigma^{2}} = -\frac{1}{2} \frac{1}{\sigma^{2}} + \frac{1}{2(\sigma^{2})^{2}} (y - x\rho)'(y - x\rho)$$

$$= \frac{1}{2\sigma^{2}} \left(-n + \frac{1}{\sigma^{2}} (y - x\rho)'(y - x\rho) \right) = 0$$

$$Assumi \delta^{2} \gamma \delta = -n + \frac{1}{\sigma^{2}} (y - x\rho)'(y - x\rho) = 0$$

 $\ell(\cdot) \propto -\frac{n}{2} \log \sigma^2 - \frac{1}{2\sigma^2} \left(\frac{\chi - \chi P}{\chi} \right)' \left(\frac{\chi - \chi P}{\chi} \right)$

$$-n + \frac{1}{\sigma^{2}}(\underline{Y}-\underline{X}\underline{P})'(\underline{Y}-\underline{X}\underline{P}) = 0$$

$$\sigma^{2} = \frac{1}{n}(\underline{Y}-\underline{X}\underline{P})'(\underline{Y}-\underline{X}\underline{P}) = 0$$

$$= \frac{1}{n}(\underline{Y}-\underline{X}\underline{P})'(\underline{Y}-\underline{X}\underline{P}) = \frac{1}{n}\sum_{i=1}^{n}(\underline{Y}_{i}-\underline{Y}_{i})^{2}$$

$$= \frac{1}{n}(\underline{Y}-\underline{Y})'(\underline{Y}-\underline{Y}) = \frac{1}{n}\sum_{i=1}^{n}(\underline{Y}_{i}-\underline{Y}_{i})^{2}$$