

(10)

① What happens if x_1 & x_2 are independent?

$$\Sigma_{12} = \emptyset$$

$$\mu_{1|2} = \mu_1 + \emptyset \cdot \Sigma_{22}^{-1} (x_2 - \mu_2) = \mu_1$$

$$\Sigma_{1|2} = \Sigma_{11} - \emptyset \Sigma_{22}^{-1} \emptyset = \Sigma_{11}$$

② If they are completely co-dependent

$$\Sigma_{12} = \Sigma_{22} = \Sigma_{11}$$

$$\mu_{1|2} = \mu_1 + \underbrace{\Sigma_{22} \cdot \Sigma_{22}^{-1}}_I (x_2 - \mu_2) = x_2 + (\mu_1 - \mu_2)$$

$$\Sigma_{1|2} = \Sigma_{11} - \Sigma_{22} \Sigma_{22}^{-1} \Sigma_{22} = \Sigma_{11} - \Sigma_{22} = 0$$

③ μ : The term $\Sigma_{12} \Sigma_{22}^{-1}$ adjusts the mean based on the co-variation

Σ : $\Sigma_{12} \Sigma_{22}^{-1} \Sigma_{21}$ adjusts the

variance based on how similar the cross-covariance is to the variations in x_2 .