Theorem 2.5.1. *Let the components of* $\mathbf{X}$ *be divided into two groups composing the subvectors* $\mathbf{X}^{(1)}$ *and* $\mathbf{X}^{(2)}$. *Suppose the mean* $\boldsymbol{\mu}$ *is similarly divided into* $\boldsymbol{\mu}^{(1)}$ *and* $\boldsymbol{\mu}^{(2)}$, *and suppose the covariance matrix* $\boldsymbol{\Sigma}$ *of* $\mathbf{X}$ *is divided into* $\boldsymbol{\Sigma}_{11}, \boldsymbol{\Sigma}_{12}, \boldsymbol{\Sigma}_{22}$, *the covariance matrices of* $\mathbf{X}^{(1)}$, *of* $\mathbf{X}^{(1)}$ *and* $\mathbf{X}^{(2)}$, *and of* $\mathbf{X}^{(2)}$, *respectively. Then if the distribution of* $\mathbf{X}$ *is normal, the conditional distribution of* $\mathbf{X}^{(1)}$ *given* $\mathbf{X}^{(2)} = \mathbf{x}^{(2)}$ *is normal with mean* $\boldsymbol{\mu}^{(1)} + \boldsymbol{\Sigma}_{12}\boldsymbol{\Sigma}_{22}^{-1}(\mathbf{x}^{(2)} - \boldsymbol{\mu}^{(2)})$ *and covariance matrix* $\boldsymbol{\Sigma}_{11} - \boldsymbol{\Sigma}_{12}\boldsymbol{\Sigma}_{22}^{-1}\boldsymbol{\Sigma}_{21}$.