

Theorem 11.32 For a fixed zero-mean Gaussian random vector \mathbf{X}^* , let

$$\mathbf{Y} = \mathbf{X}^* + \mathbf{Z},$$

where the joint pdf of \mathbf{Z} exists and \mathbf{Z} is independent of \mathbf{X}^* . Under the constraint that the correlation matrix of \mathbf{Z} is equal to K , where K is any symmetric positive definite matrix, $I(\mathbf{X}^*; \mathbf{Y})$ is minimized if and only if $\mathbf{Z} = \mathbf{Z}^* \sim \mathcal{N}(0, K)$.