

②

$$a) E[y] = E[Ax + Az] = A E[x] + A c = A(u_x + c)$$

$$\begin{aligned} b) \Sigma_y &= E[(y - E[y])(y - E[y])^T] \\ &= E[(A(x+c) - A(u_x + c))(A(x+c) - A(u_x + c))^T] \\ &= E[(A(x - u_x))(A(x - u_x))^T] = E[Axx^T A^T] - A u_x u_x^T A \\ &= E(E[xx^T] - u_x u_x^T) A^T = A \Sigma_x A^T \end{aligned}$$