

(2)

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

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