

- 5.94** Let Y_1 and Y_2 be uncorrelated random variables and consider $U_1 = Y_1 + Y_2$ and $U_2 = Y_1 - Y_2$.
- a** Find the $\text{Cov}(U_1, U_2)$ in terms of the variances of Y_1 and Y_2 .
 - b** Find an expression for the coefficient of correlation between U_1 and U_2 .
 - c** Is it possible that $\text{Cov}(U_1, U_2) = 0$? When does this occur?

- 5.141** Let Y_1 have an exponential distribution with mean λ and the conditional density of Y_2 given $Y_1 = y_1$ be

$$f(y_2 | y_1) = \begin{cases} 1/y_1, & 0 \leq y_2 \leq y_1, \\ 0, & \text{elsewhere.} \end{cases}$$

Find $E(Y_2)$ and $V(Y_2)$, the unconditional mean and variance of Y_2 .