

EXERCISES IN STATISTICS

Series A, No. 6

1. Let x_1 and x_2 have the joint p.d.f $f(x_1, x_2) = x_1 + x_2$ with $0 \leq x_1, x_2 \leq 1$. Find the conditional mean of x_2 given x_1 .
2. Find the $P(x < y | x < 2y)$ when $f(x, y) = e^{-(x+y)}$. Draw a diagram to represent the event.
3. The variance of $x_1 + x_2$ is $V(x_1) + V(x_2) + 2C(x_1, x_2)$. Extend this result to find the variance of $x_1 + x_2 + x_3$.
4. Find $V(x_1 - x_2)$. Prove that

$$C(x_1, x_2) \leq \sqrt{V(x_1)V(x_2)} \leq \frac{1}{2}\{V(x_1) + V(x_2)\}.$$