IMM - DTU

02405 Probability
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BFN/bfn

Solution for exercise 6.4.5 in Pitman

Question a) We calculate the covariance of X and Y using the definition page 630.

$$Cov(X,Y) = E(XY) - E(X)E(Y) = E(XY)$$

since $E(X) = 0$ We calculate

$$E(XY) = E(X^3) = \int_{-1}^{1} x^3 \frac{1}{2} \mathrm{d}x = 0$$

thus X and Y are uncorrelated.

Question b) We have

$$P\left(Y > \frac{1}{4} \middle| \, |X| > \frac{1}{2}\right) = 1 \neq P\left(Y > \frac{1}{4}\right)$$

thus X and Y are *not* independent.