IMM - DTU

02405 Probability
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BFN/bfn

Solution for exercise 5.3.12 in Pitman

Question a) Let the coordinates shot i be denoted by (X_i, Y_i). The difference between two shots $(X_2 - X_1, Y_2 - Y_1)$ is two independent normally distributed random variables with mean 0 and variance 2. By a simple a scaling in example 1 problem 2 page 361 we get $E(D) = \sqrt{2}\sqrt{\frac{\pi}{2}} = \sqrt{\pi}$.

Question b) We have $E(D^2) = 4$ thus $Var(D) = 4 - \pi$.