Stat 134: Section X

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Problem 1

Let (X, Y) be picked uniformly from the unit disc $R^2 \leq 1$, where $R^2 = X^2 + Y^2$. Find

1. the joint desity of R and X;

2. Optional: repeat a) for a point (X, Y, Z) picked at random from the inside the unit sphere $R^2 \leq 1$, where now $R^2 = X^2 + Y^2 + Z^2$.

Ex 5.2.17 in Pitman's Probability

Problem 2

Let X be exponentially distributed with rate λ, independent of Y, which is exponentially distributed with rate μ. Find $P(X \geq 3Y)$.

Ex 5.2.5 in Pitman's Probability

Problem 3

Let X and Y be independnet and uniform $(0,1)$ and let $R = \sqrt{X^2 + Y^2}$.
Answer the following questions:

1. Find out the density $f_R(r)$.

2. Find out the CDF $F_R(r)$.

Ex 5.2.20 in Pitman's Probability

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