TA SESSION # 2
ECON 341: ECONOMETRICS

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Problem (2.11 (b)). Let X have the standard normal pdf

$$f(x) = \frac{1}{\sqrt{2\pi}} \exp(-x^2/2).$$

Find the pdf of $Y = |X|$, and find its mean and variance.

Problem (2.30). Find the moment generating function corresponding to

(a) $f(x) = \frac{1}{c}$ for $0 < x < c$
(b) $f(x) = \frac{2x}{c^2}$ for $0 < x < c$
(c) $P(X = x) = \binom{r+x-1}{x} P^r (1-p)^x$, for $x = 0, 1, \ldots$, $0 < p < 1, r > 0$ and integer.

Problem (3.15). From the book we learned that the Poisson(λ) distribution is the limit of the negative binomial(r, p) distribution as $r \to \infty$, $p \to 1$ and $r(1-p) \to \lambda$. Show that under these conditions the moment generating function of the negative binomial converges to that of the Poisson.

Problem (4.19,4.20). Let X_1 and X_2 be independent $N(0, 1)$ random variables:

(a) Find the pdf of

$$\frac{(X_1 - X_2)^2}{2}$$

(b) For:

$$Y_1 = X_1^2 + X_2^2; \quad Y_2 = \frac{X_1}{\sqrt{Y_1}}$$

Find the joint distribution of Y_1 and Y_2, and show they are independent.

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