7. Univariate Gaussians

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Homework0 due Feb 8, 2023 08:59 -03 Completed

A univariate **Gaussian** or **normal distributions** can be completely determined by its me

Gaussian distributions can be applied to a large numbers of problems because of the c (CLT). The CLT posits that when a large number of **independent and identically distrib** variables are added, the cumulative distribution function (cdf) of their sum is approxima normal distribution.

Recall the probability density function of the univariate Gaussian with mean μ and varia

$$f_X(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-(x-\mu)^2/(2\sigma^2)}.$$

Probability review: PDF of Gaussian distribution

2/2 points (graded)

In practice, it is not often that you will need to work directly with the probability density Gaussian variables. Nonetheless, we will make sure we know how to manipulate the (pd problems.

The pdf of a Gaussian random variable X is given by

$$f_X(x) = \frac{n}{3\sqrt{2\pi}} \exp\left(-\frac{n^2(x-2)^2}{18}\right),$$

then what is the mean μ and variance σ^2 of X?
(Enter your answer in terms of n.)

$\mu =$ 2 ✔

$\sigma^2 =$ 9/n^2 ✔

? STANDARD NOTATION

$f_Y(y)$ =

1/sqrt(8*pi*sigma^2)*exp(-(y-2*mu)^2/(8*sigma^2))

? STANDARD NOTATION

Submit You have used 3 of 3 attempts

Argmax

1/1 point (graded)

Let $f_X(x; \mu, \sigma^2)$ denote the probability density function of a normally distributed variable X with mean μ and variance σ^2. What value of x maximizes this function?

(Enter **mu** for the mean μ, and **sigma^2** for the variance σ^2.)

mu

? STANDARD NOTATION

Submit You have used 1 of 3 attempts

Maximum of pdf

1/1 point (graded)

As above, let $f_X(x; \mu, \sigma^2)$ denote the probability density function of a normally distributed variable X with mean μ and variance σ^2.

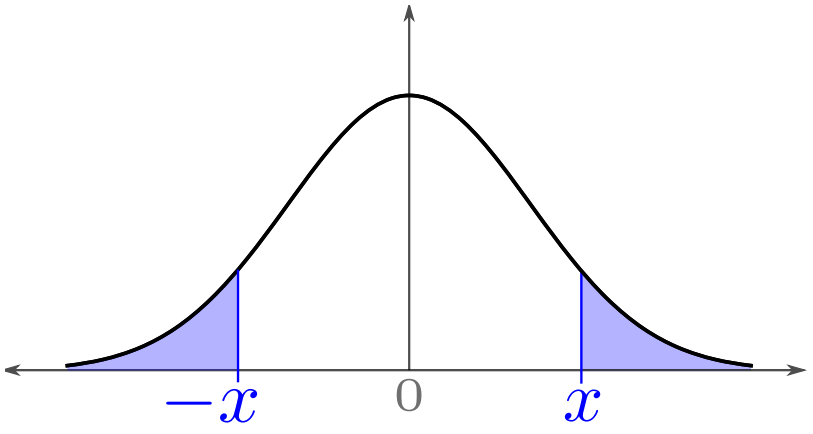
What is the maximum value of $f_X(x; \mu, \sigma^2)$?

(Enter **mu** for the mean μ, and **sigma^2** for the variance σ^2.)

1 / sqrt(2*pi*sigma^2)

R.)

Graphed below is the pdf of the normal distribution with generic/unknown (but fixed) v
area of the two shaded regions is 0.03, then what is x?
(Choose all that apply.)



The total area of the two shaded regions is 0.03.

- [ ] $\mathbf{P}(|X| \leq 0.03)$
- [ ] $\mathbf{P}(|X| \leq 0.015)$
- [ ] 0.97
- [ ] 0.985
- [x] $q_{0.03}$
- [x] $q_{0.015}$

✖

Submit You have used 2 of 2 attempts

Probability

1/1 point (graded)
Let $X \sim \mathcal{N}(1, 2)$, i.e., the random variable X is normally distributed with mean 1 and varia
probability that $X \in [0.5, 2]$?

Univariate Gaussians

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- Probability
  I have a question, I wrote in python but it counts wrong :(import scipy.stats as stats mu = 1 sigma = sqrt(2) x
- any hint on the last question?
  I don't know why I got this incorrect. My approach: I standardized the random variable, so that the pdf becor
- Probability of (0.5<=x<=2)
  To calculate the probability just use the formula for normal CDF, there are many online calculators available a
- [STAFF] Argmax
  I entered it correctly at first, then accidentally tried to submit my answer for the next question (maximum of
- Do we need to take Fundamentals of Statistics first?
  As part of the MicroMasters, I have only taken the Probability course. I didn't see Statistics as part of the pre
- Maximum of pdf
  Any solution for Maximum of pdf?
- Resource for quantiles?
  I am struggling a bit with the question on the quantiles. I think I have two issues. - Getting a bit confused by
- Last question
  For the last question, why do we get completely different answers depending on the method that we have us
- Quantiles
  Are the choices correct. P(X <= q(alpha)) = 1-alpha = 0.015 , alpha should be 1 - 0.015 = 0.985 , x should be
- The notation input is really horrible!
  1/(2*sigma*sqrt(2*pi)) * exp(-(y-4*mu)^2/(8*sigma^2)) you have to try a million times. This is wasting everyo
- Probability review: PDF of Gaussian distribution
- Probability review: PDF of Gaussian distribution
  When adding two pdf isn't the variance the sum of the two? The correct answer seems wrong....

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