Question #12776

DISCUSS ANY ONE CONTINUOUS PROBABILITY DISTRIBUTION.

Solution.

Here we will discuss normal distribution $N(\mu, \sigma^2)$. The distribution density function is $f(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$, $x \in (-\infty, +\infty)$. Mean equals μ, variance equals σ^2. Characteristic function equals $\varphi(t) = e^{i\mu t - 1/2 t^2 \sigma^2}$. If $X \sim N(\mu, \sigma^2)$ then $\frac{X-\mu}{\sigma}$ has standard normal distribution $N(0, 1)$. The normal random X variable with 'big' probability takes values near μ. For instance, $P(|X - \mu| \geq 3\sigma) \approx 0.0027$.