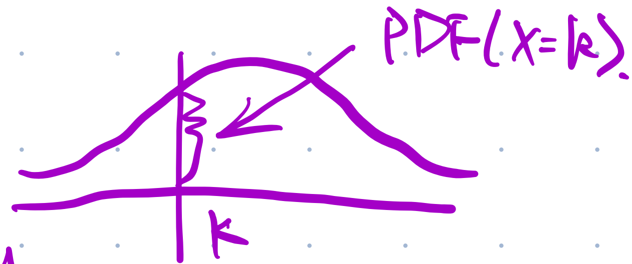
Continuous R.V. distribution.

1. PDF of any continous R.V. is meaningless. it's not a probability

probability density function



for any continuous R.V. $P(X=k)=0$

only $P(a \le X \le b)$ is a prob.

2. $P(a \le X \le b) \Rightarrow$ CDF

Cumulative distribution function

For discrete R.V. PDF is prob.

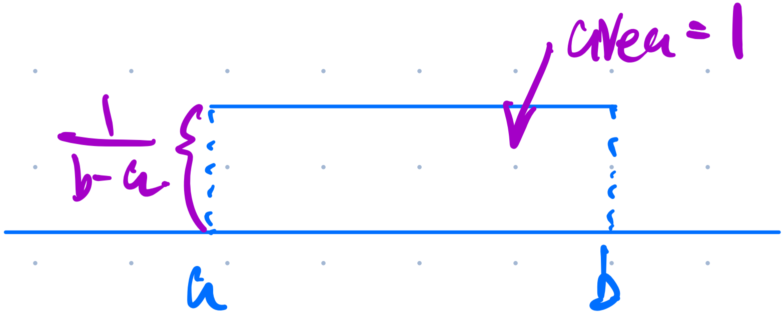
i.e. $P(X=k) > 0$

For continuous R.V. PDF is not probability. $P(X=k) = 0$.

Special continuous R.V. distribution.

1) uniform distribution

$X \sim \text{Uniform}(a, b)$



symmetric

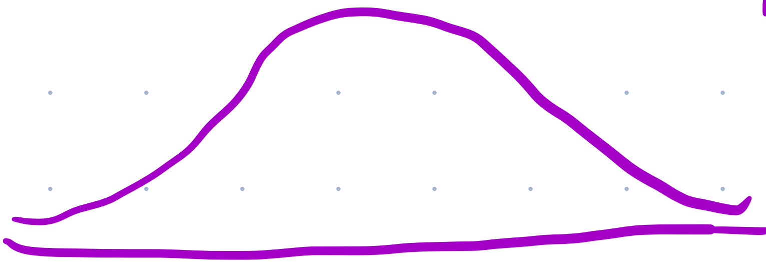
$E(X) = Med(X)$.

a $P(i \le X \le j) = \dfrac{j-i}{b-a}$

$E(X) = \dfrac{a+b}{2}$ 记.

$Std(X) = \dfrac{b-a}{\sqrt{12}}$ 不记

2) normal distribution $X \sim Norm(\mu_x, \sigma_x)$



bell-shaped

density curve

symmetric

$$P(a \le x \le b) = normalcdf\left(\begin{array}{l} lower: a \\ upper: b \\ \mu: \mu_x \\ \sigma: \sigma_x \end{array}\right)$$

$\mu \cdot \sigma$ is a given parameter.

one R.V.

$$\begin{cases} E(X \pm a) = E(X) \pm a. \\ E(kX) = kE(X). \\ E(kX \pm a) = kE(X) \pm a. \end{cases}$$

Two R.V.

$$E(X \pm Y) = E(X) \pm E(Y).$$

no condition.

$$E(aX \pm bY \pm c) = aE(X) \pm bE(Y) \pm c.$$

$$E(aX \pm bY \pm cZ \pm d) = aE(X) \pm bE(Y) \pm cE(Z) \pm d.$$

$$\mathrm{std}(aX) = \sqrt{a}\,\mathrm{std}(X)$$

$$\mathrm{std}(X+b) = \mathrm{std}(X)$$

$$\mathrm{std}(aX+b) = \sqrt{a}\,\mathrm{std}(X)$$

$$\mathrm{std}(X \pm Y) = \sqrt{\mathrm{std}^2(X) + \mathrm{std}^2(Y)}$$

$$\mathrm{std}(X \pm Y \pm Z) = \sqrt{\mathrm{std}^2(X) + \mathrm{std}^2(Y) + \mathrm{std}^2(Z)}$$

$$\mathrm{Std}(aX+bY+c)=\sqrt{a\,\mathrm{std}^2(X)+b\,\mathrm{std}^2(Y)}$$