



variable continuous variable



# variance of a continuous random variable

Let  $X$  be a continuous random variable with pdf  $f(x)$  and mean  $E(X) = \mu$ . The variance  $V(X)$  is the expected value of the squared distance to the mean

$$V(X) = E((X - \mu)^2) = \int_{-\infty}^{\infty} (x - \mu)^2 \cdot f(x) dx$$

The standard deviation is given by  $\sqrt{V(X)}$ .

# theoretical joint distributions

For two continuous random variables, we can write their joint pdf the same way:  $f(x, y)$

"summing" the small bits of probability  $f(x, y)dx dy$  over some region  $X \in A, Y \in B$