

sample variance of  $x_1, x_2, \dots, x_n$

$$S^2 = \sum_{i=1}^n \frac{(x_i - \bar{x})^2}{n-1}$$

$$E(S^2) = \sigma^2$$

$$E(g(x)) \neq g(E(x))$$

(in general)

ie

$$E(\sqrt{x}) \neq \sqrt{E(x)}$$

$$E(x^2) \neq (E(x))^2$$

$$\text{Var } X = E(x^2) - E(x)^2$$

$$E(\text{SD}(x)) \neq \sqrt{\text{Var}(x)}$$