

All the Stuff You Need To Know

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Welcome!
Everything is fine.

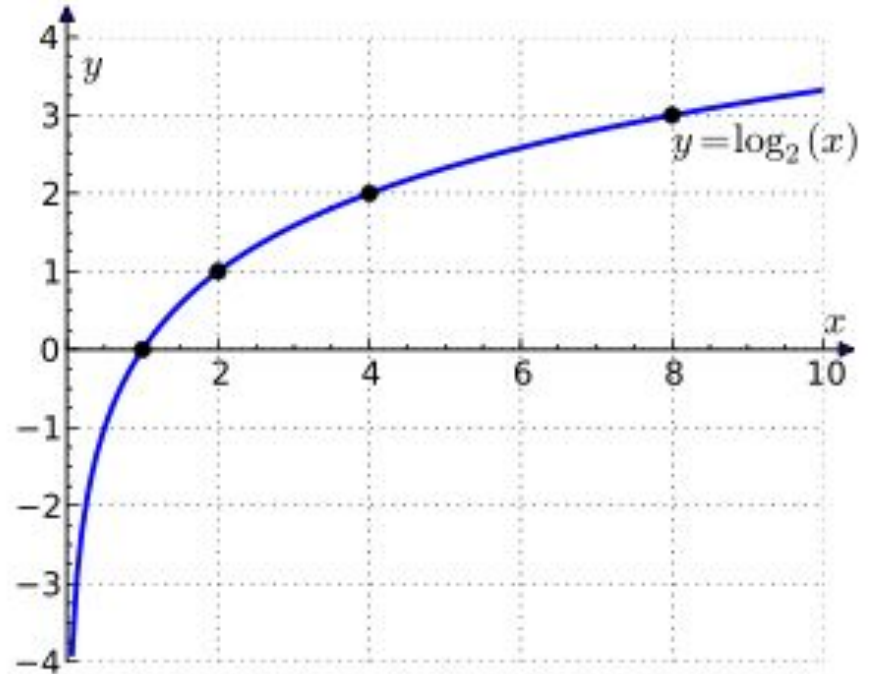


Mean, Median, Mode

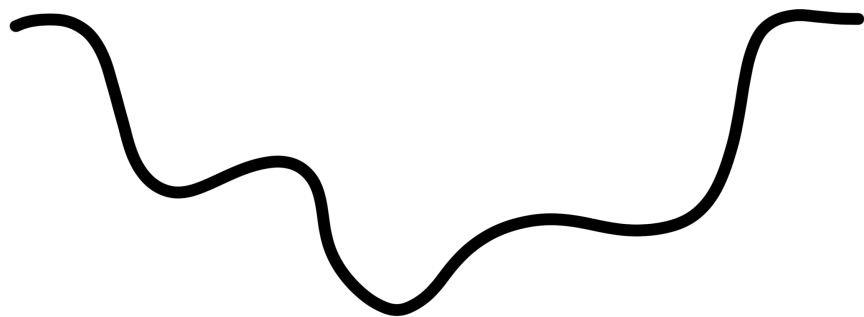
Standard Deviation, Standard Error

Logarithms

Log rules:

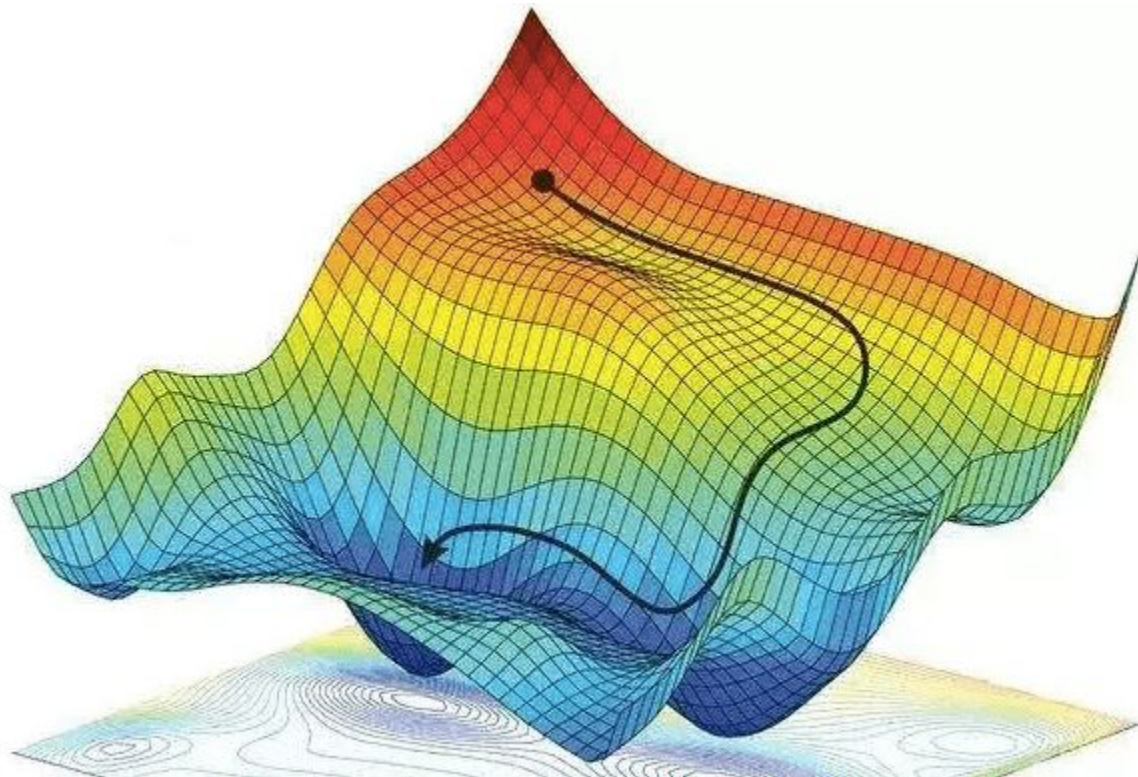


Derivatives

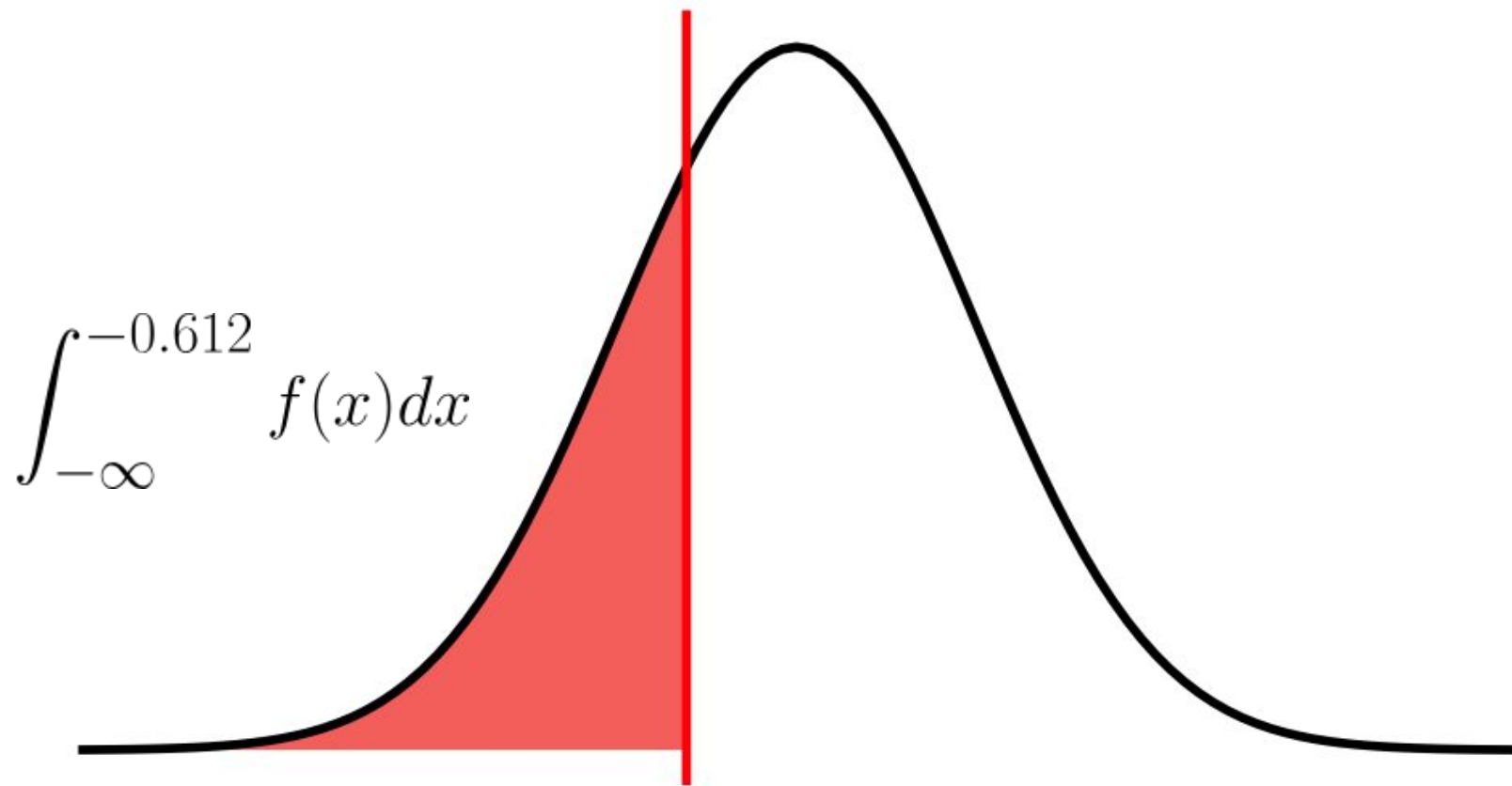


Second Derivatives

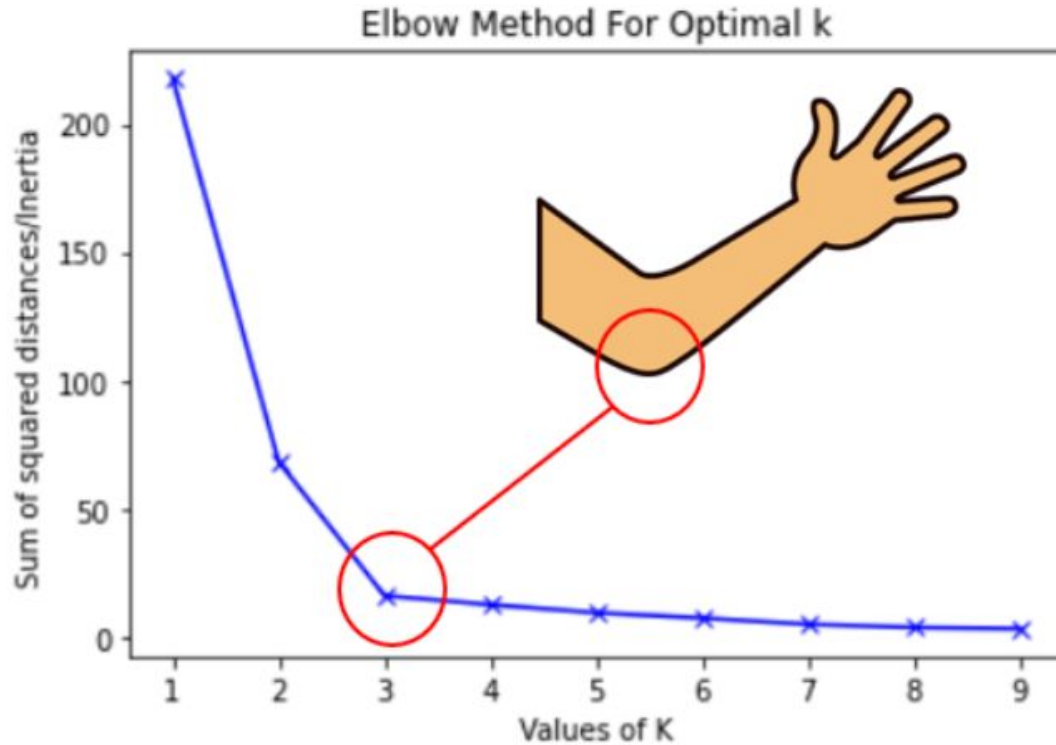
Partial Derivative



Integrals



Elbow Method



Line plot between K and inertia

Matrices and Vectors

- Data as a Matrix/Vector (it's just an excel spreadsheet)
- Matrix Algebra

$$\begin{bmatrix} 1 & 0 & 1 \\ 2 & 3 & 1 \\ 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 1 \\ 0 & 1 & 0 \end{bmatrix} = \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}$$

Eigendecomposition

Variance and Covariance

Which has higher variance?

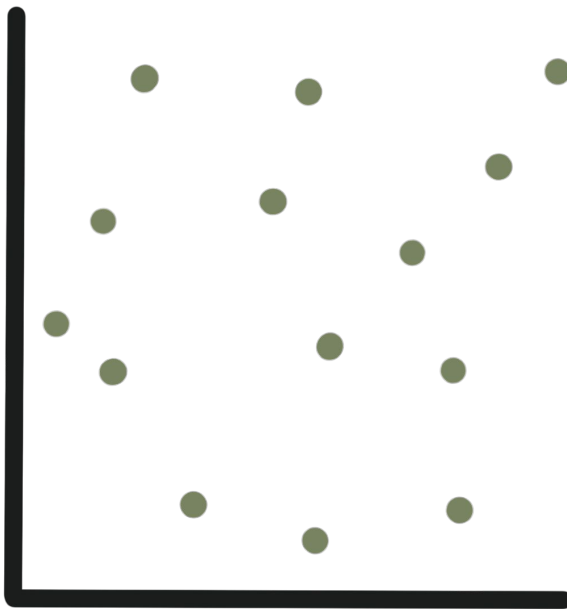
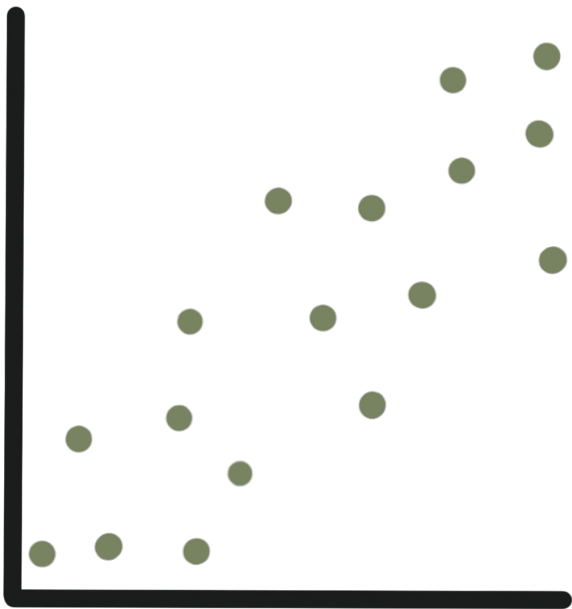
$$\frac{\sum (x_i - \mu)^2}{N}$$



Variance and Covariance

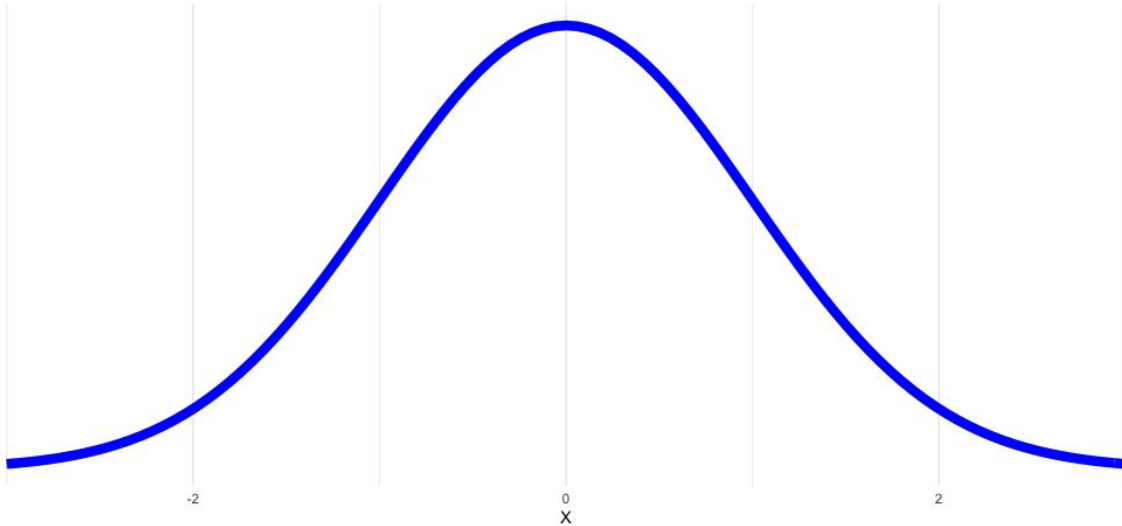
Which has higher covariance?

$$\frac{\sum (x_i - \mu_x)(y_i - \mu_y)}{N}$$



Normal Distribution

- Symmetric, Unimodal
- “Bell Curve”
- 68-95-99.7 rule
- CLT



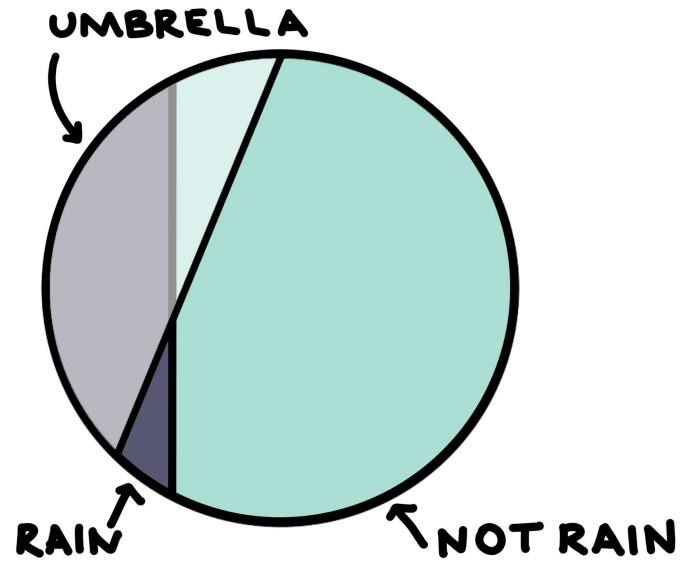
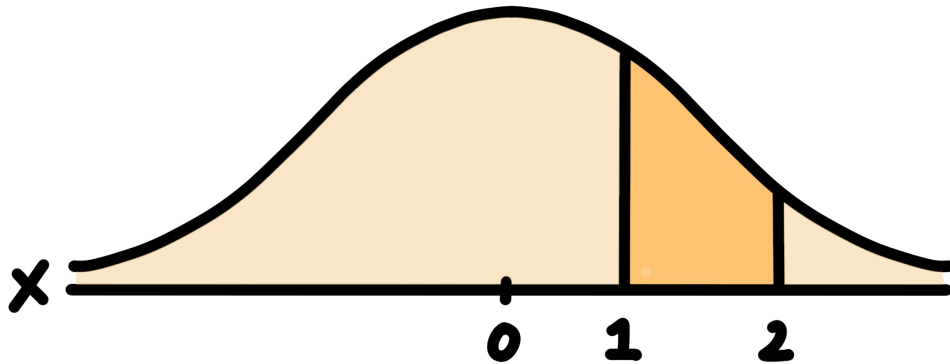
Data Types

- Continuous
- Categorical
 - Nominal
 - Dummy
 - Ordinal
 - Interval
- Boolean
- Text

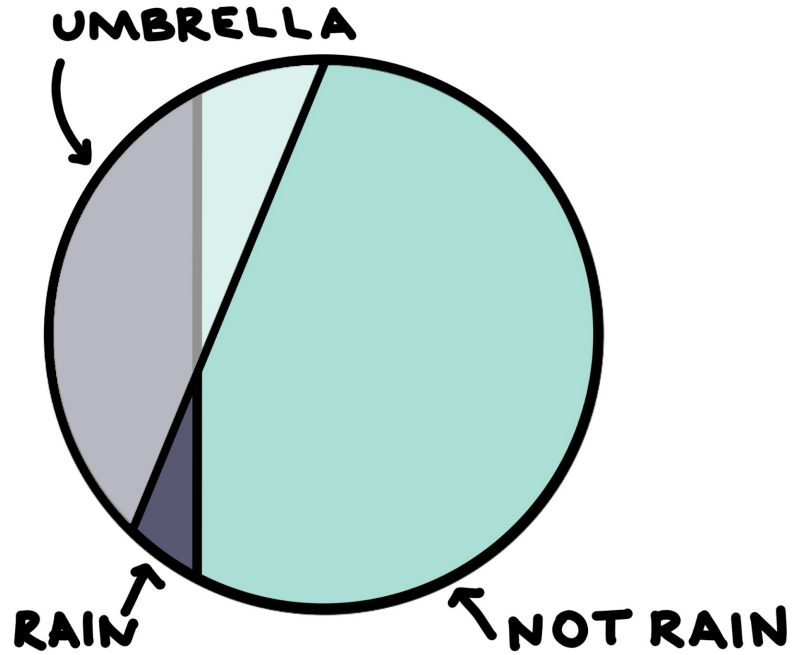
Entropy

Probability

$$P(1 > x > 2 \mid \mu = 0, \text{sd} = 1)$$



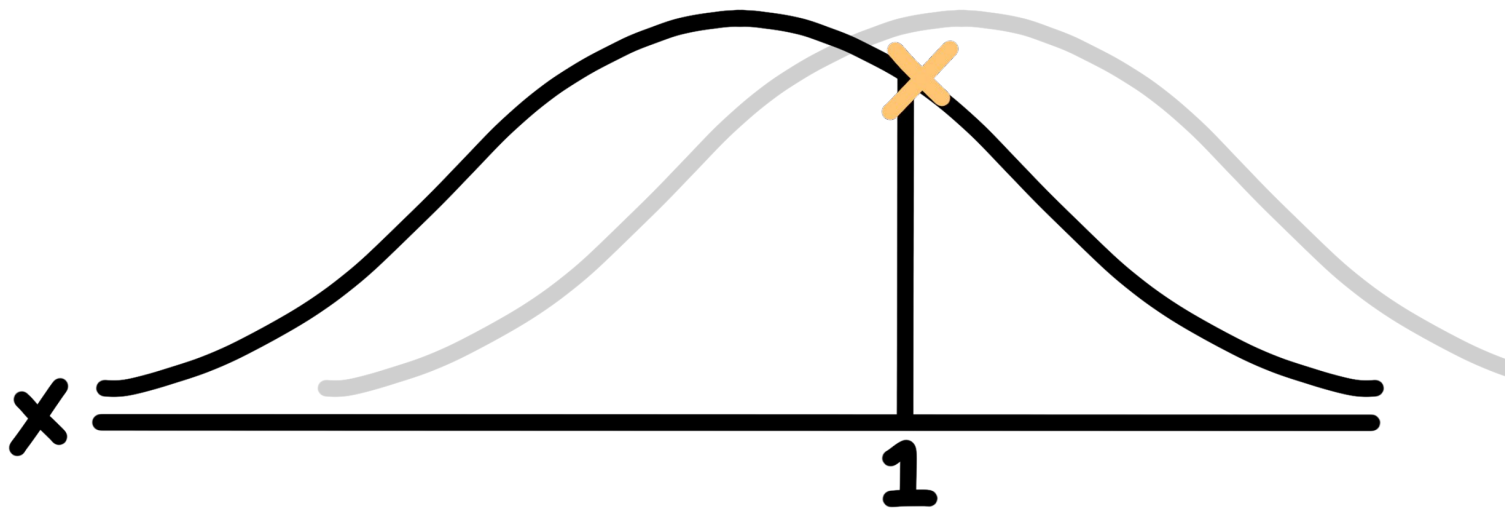
Conditional Probability



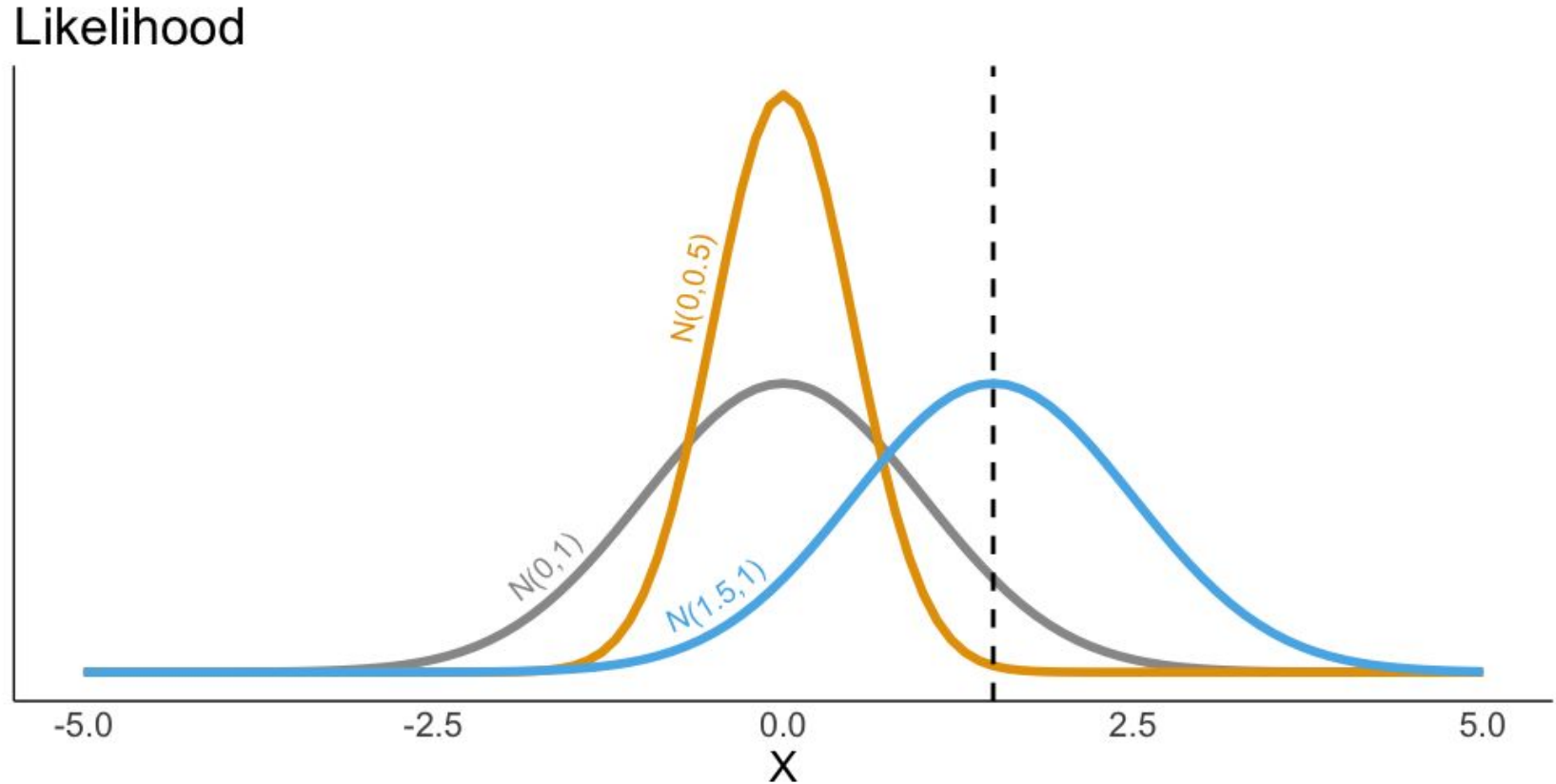
Bayes Rule

Likelihood

$$P(u=0, sd=1 \mid x=1)$$



Maximum Likelihood Estimation



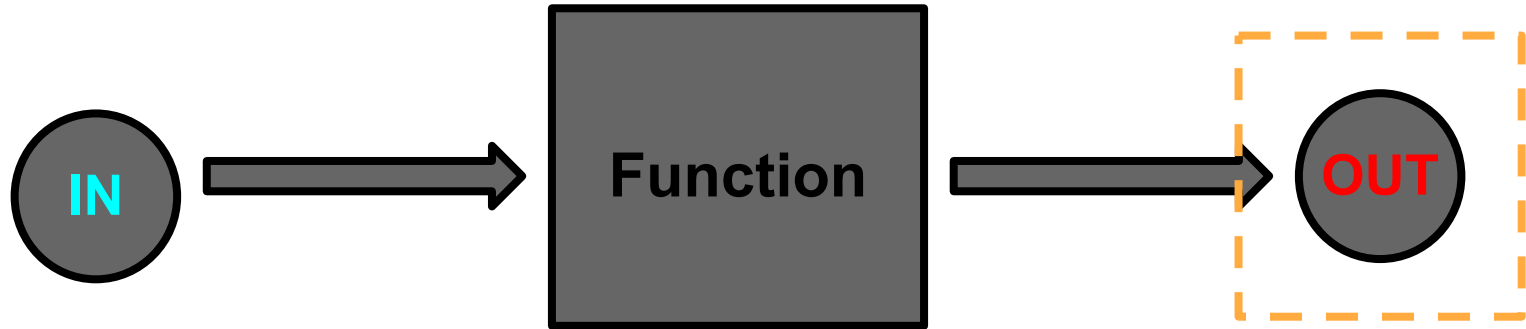
Maximum Likelihood Estimation

Odds

$$\frac{p}{1-p}$$

Prediction vs. Inference

Prediction



Prediction vs. Inference

Inference

