The Bernoulli distribution

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Bernoulli trial

Single experiment that results in one of two possible outcomes:

Success or Failure

- $P(Success) = p$
- $P(Failure) = 1 - p$

Example: Tossing a fair coin. $P(Heads) = p = 0.5$

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Bernoulli Distribution

- A Bernoulli random variable X assigns $X = 1$ when a success occurs and $X = 0$ when a failure occurs.

- X follows a Bernoulli distribution:

$$\mathrm{P}(\mathrm{X} = 1) = P(Success) = p$$

$$\mathrm{P}(\mathrm{X} = 0) = P(Failure) = 1 - p$$

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Bernoulli Distribution

- A Bernoulli random variable X assigns $X = 1$ when a success occurs and $X = 0$ when a failure occurs.

- X follows a Bernoulli distribution:

$$p(x) = p^x(1-p)^{1-x}, \qquad for\ x \in \{0,1\}$$

$P(X = x)$

$$p(1) = p^1(1-p)^{1-1} = p \quad \checkmark$$

$$p(0) = p^0(1-p)^{1-0} = 1-p \quad \checkmark$$

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Properties

Expectation: $E(X) = p$

Variance: $Var(X) = p(1-p)$

Independent Bernoulli trials are building blocks in the construction of several other probability distributions.

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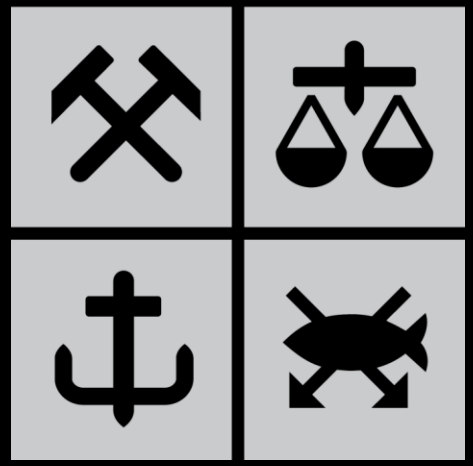

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