Axiomas y fórmulas de la probabilidad

$$\text{Probabilidad} = \frac{\text{número de casos favorables}}{\text{número de casos posibles}} \tag{1}$$

$$P(\Omega) = 1 \tag{2}$$

$$P(\varnothing) = 0 \tag{3}$$

$$\text{Si } A \subset \Omega \rightarrow 0 \leq P(A) \leq 1 \tag{4}$$

$$P(A \cup B) = P(B \cup A) \tag{5}$$

$$P(\overline{A}) = 1 - P(A) \tag{6}$$

$$\text{Si } A \subset B \rightarrow P(A) \leq P(B) \tag{7}$$

$$\text{Si } A \subset B \rightarrow P(B - A) = P(B) - P(A) \tag{8}$$

$$\text{Si } A, B \subset \Omega \rightarrow P(B \cap \overline{A}) = P(B - A) = P(B) - P(A \cap B) \tag{9}$$

$$P(A \cap \overline{B}) = P(A - B) = P(A) - P(A \cap B) \tag{10}$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) \tag{11}$$

$$\text{Probabilidad condicionada} \qquad P(A|B) = \frac{P(A \cap B)}{P(B)} \tag{12}$$

$$\text{Sucesos independientes} \qquad P(A \cap B) = P(A) \cdot P(B) \tag{13}$$

Leyes de Morgan

$$\overline{A \cup B} = \overline{A} \cap \overline{B} \tag{14}$$

$$\overline{A \cap B} = \overline{A} \cup \overline{B} \tag{15}$$

Teorema de la probabilidad total

$$P(B) = \sum_{i=1}^{n} P(B|A_i) \cdot P(A_i) \tag{16}$$

Teorema de Bayes

$$P(A_i|B) = \frac{P(B|A_i) \cdot P(A_i)}{P(B)} = \frac{P(B|A_i) \cdot P(A_i)}{\sum\limits_{i=1}^{n} P(B|A_i) \cdot P(A_i)} \tag{17}$$

Distribución de probabilidad binomial

$$P(N,k) = \binom{N}{k} \cdot p^k \cdot (1-p)^{N-k} = \frac{N!}{k! \cdot (N-k)!} \cdot p^k \cdot (1-p)^{N-k} \tag{18}$$

$$N! = N \cdot (N-1) \cdot (N-2) \ldots \cdot 1 \tag{19}$$