STA 131 B: Mathematical Statistics **Spring 2024**

Lecture 0: Notations

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This note outlines the notations used throughout this course, subject to updates.

- "*r.v.*" stands for "random variable(s)".
- $\sum_{i=1}^{n} a_i = a_1 + a_2 + \cdots + a_n$ is the summation notation.
- "$\sim$" stands for "distributed as", a notation commonly used in statistics to denote that a random variable follows a specified distribution.
- "i.i.d." stands for "independently and identically distributed", referring to a set of random variables that are all distributed according to the same probability distribution and are mutually independent.
- $\mathbb{R}$ denotes the set of real numbers.
- $\mathbb{R}^p$ is the p-dimensional Euclidean space.
- θ is the parameter and Θ is the parameter space.
- $(a, b) := \{x \in \mathbb{R} : a < x < b\}$ defines the open interval containing all real numbers strictly greater than a and strictly less than b.
- $[a, b] := \{x \in \mathbb{R} : a \leq x \leq b\}$ defines the closed interval containing all real numbers greater than or equal to a and less than or equal to b.
- $(a, b] := \{x \in \mathbb{R} : a < x \leq b\}$ and $[a, b) := \{x \in \mathbb{R} : a \leq x < b\}$ describe the half-open intervals.
- For two sets A and B, the Cartesian product of A and B is denoted by $A \times B := \{(a, b) : a \in A, b \in B\}$. For example, $\mathbb{R} \times (0, \infty) := \{(x, y) : x \in \mathbb{R}, y \in (0, \infty)\}$.
- $\mathcal{N}(\mu, \sigma^2)$ represents the 1-dimensional normal distribution with mean μ and standard deviation σ.
- Bernoulli(p) denotes the Bernoulli distribution with success probability p.