STATS 266 Handout - Introduction & Basics

Qi Wang

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Contents

1 Introduction

Welcome to **STATS 266: Introduction to R**. This handout provides an overview of R, including its installation, basic operations, and data handling capabilities. By the end of this document, you should be able to:

- Understand the purpose of R and RStudio.
- Install and set up R for your coursework.
- Learn basic R syntax, data structures, and visualization tools.

2 What is R?

2.1 Overview

R is a programming language specifically designed for **statistical computing, data analysis, and visualization**. It is widely used in academia, research, and industry.

2.1.1 Why use R?

- **Open-source** and free to use.
- **Strong statistical capabilities** with built-in functions.
- **Data visualization tools** like `ggplot2`.
- **Extensive community support** with thousands of packages available on CRAN.

3 Installing R and RStudio

3.1 Installing R

To install **R**, follow these steps: 1. Visit the **CRAN** website: https://cran.r-project.org/ 2. Select your operating system (**Windows / macOS / Linux**). 3. Download and install the latest version.

3.2 Installing RStudio

RStudio is an **Integrated Development Environment (IDE)** for R that provides: - A user-friendly interface. - Code organization tools. - An embedded console and visualization panel.

3.2.1 Installation Steps:

1. Visit RStudio Download Page
2. Choose your operating system and download **RStudio Desktop**.
3. Install and open RStudio.

4 Getting Started with R

4.1 RStudio Interface Overview

After opening **RStudio**, you will see four main panels: 1. **Console**: Where you enter R commands. 2. **Environment/History**: Displays variables and past commands. 3. **Files/Plots/Packages**: Manages files, plots, and installed packages. 4. **Script Editor**: Write and save R scripts (`.R` files).

4.2 Basic R Commands

4.2.1 Mathematical Operations

```r
# Basic arithmetic
3 + 5       # Addition
10 - 4      # Subtraction
5 * 2       # Multiplication
10 / 2      # Division
2^3         # Exponentiation
sqrt(16)    # Square root
```

5 Getting Started with R

5.1 Basic Syntax

Here are some fundamental R commands:

```r
# Basic arithmetic
2 + 2
sqrt(16)
```