



A Repository for R in Economics

Timur Öztürk

Lecture 1: Getting Started with R

May 6, 2025

Introduction

- **What is R?** R is a programming language and software environment for statistical computing and graphics. It is a free software environment for statistical computing and graphics. The R language is widely used among economists and data scientists for data analysis, visualization, and statistical modeling. R is an open source project supported by the R Foundation for Statistical Computing. The R language is widely used among economists and data scientists for data analysis, visualization, and statistical modeling.
- **What do we do today?:**
 - We will install R and RStudio. (This is done for you in the computer labs.)
 - We will talk about the RStudio interface.
 - We will learn about OOP, functions, and packages.
 - We will learn how to load and plot spatial data in R.

Understanding the Basics

Let's start with the basic uses of R. Our learning outcomes for this section are:

- **Calculator.** We could use it as a calculator.
- **Objects.** We could assign and manipulate objects.
 - These objects could be anything: numbers, strings, vectors, matrices, data frames, etc.
 - We will mostly use dataframes, vectors and polygons.
- **Functions.** We could use functions to manipulate objects.
- **Packages.** We could use packages to extend the functionality of R.
 - Packages are collections of functions. They are going to be our main tools for spatial analysis.

Understanding the Basics

- Internet is your friend; we encourage you to use it.
 - Google, StackOverflow, ChatGPT will help you.
- If you are complete beginner to R and/or programming, or looking at these slides later, check this website out! <https://moderndive.com/1-getting-started.html>
- RStudio also has an introduction: <https://education.rstudio.com/learn/>

Basics of R: Basic Calculations

```
# Basic calculations in R
2 + 3
4 * 5
timur <- 10
numbers <- c(1, 2, 3, 4, 5)
object <- c("timur", TRUE, 4)
standard_deviation <- sd(numbers)
sigma_sq <- var
quantile(numbers)
hist(numbers)

cat("Numbers :", numbers)
text <- "Numbers :"
cat(text, numbers)
```

Basics of R: Functions

```
# Function to calculate the mean of a vector of numbers.  
my_mean <- function(x) {  
  sum(x) / length(x)  
}  
  
# Now, call the function with a vector of numbers.  
my_vector <- c(1, 2, 3, 4, 5)  
result <- my_mean(my_vector)  
# You can display the result again, try in the console by writing result.
```

Basics of R: Data Types

```
# Data Types
```

```
x          <- 10          # numeric
x_num      <- 10L         # integer literal
x_chr      <- "Gandalf"    # character
x_logical  <- TRUE        # logical

print(class(x_logical))
```

Basics of R: Data Structures

```
# Structuring Data
vec      <- c(1, 2, 3, 4, 5)                # atomic vector
lst      <- list("apple", 10, TRUE)         # heterogeneous list
mat      <- matrix(1:9, nrow=3)             # 3x3 matrix
arr      <- array(1:24, dim=c(2,3,4))      # 3D array
fctr     <- factor(c("yes", "no", "yes", "yes")) # categorical
df       <- data.frame(Name=c("Frodo", "Sam", "Merry"),
Age=c(51, 39, 36),
City=c("Shire", "Shire", "Shire"))
```


Basics of R: Control Flows

```
a <- 5

if (a > 10) {
  message("a is greater than 10")
} else {
  message("a is not greater than 10")
}

for (i in 1:5) message(i)
i <- 1
while (i <= 5) {
  message(i)
  i <- i + 1
}
```