Análisis de Series Temporales: Tarea 3

Sergio García Prado

sergio.garcia.prado@alumnos.uva.es

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- **Archivo**: `weight-loss.csv`
- **Serie**: [TODO].

1. Etapa de identificación

[TODO]

[TODO]

[TODO]

[TODO]

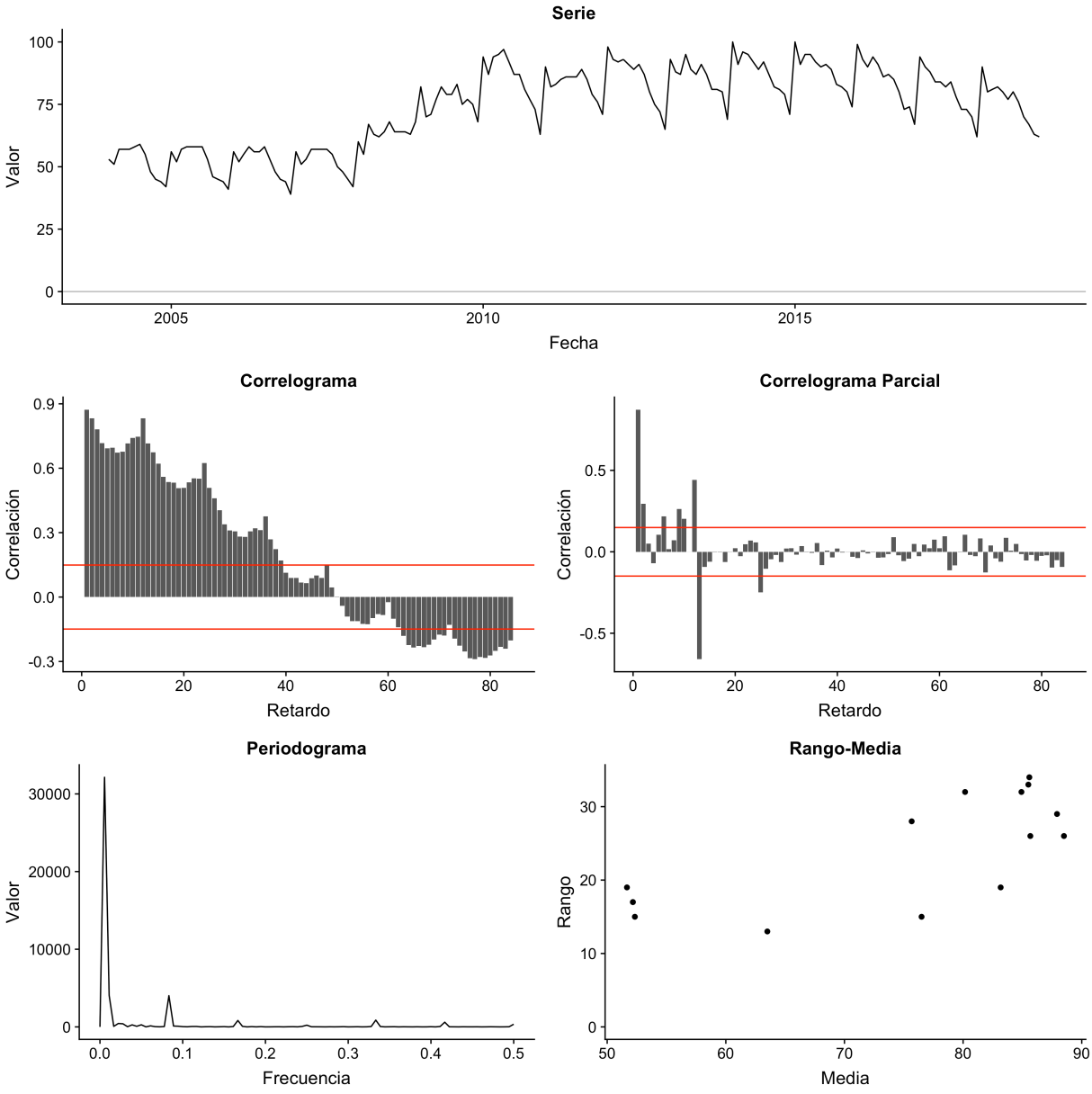

Figura 1: [TODO]

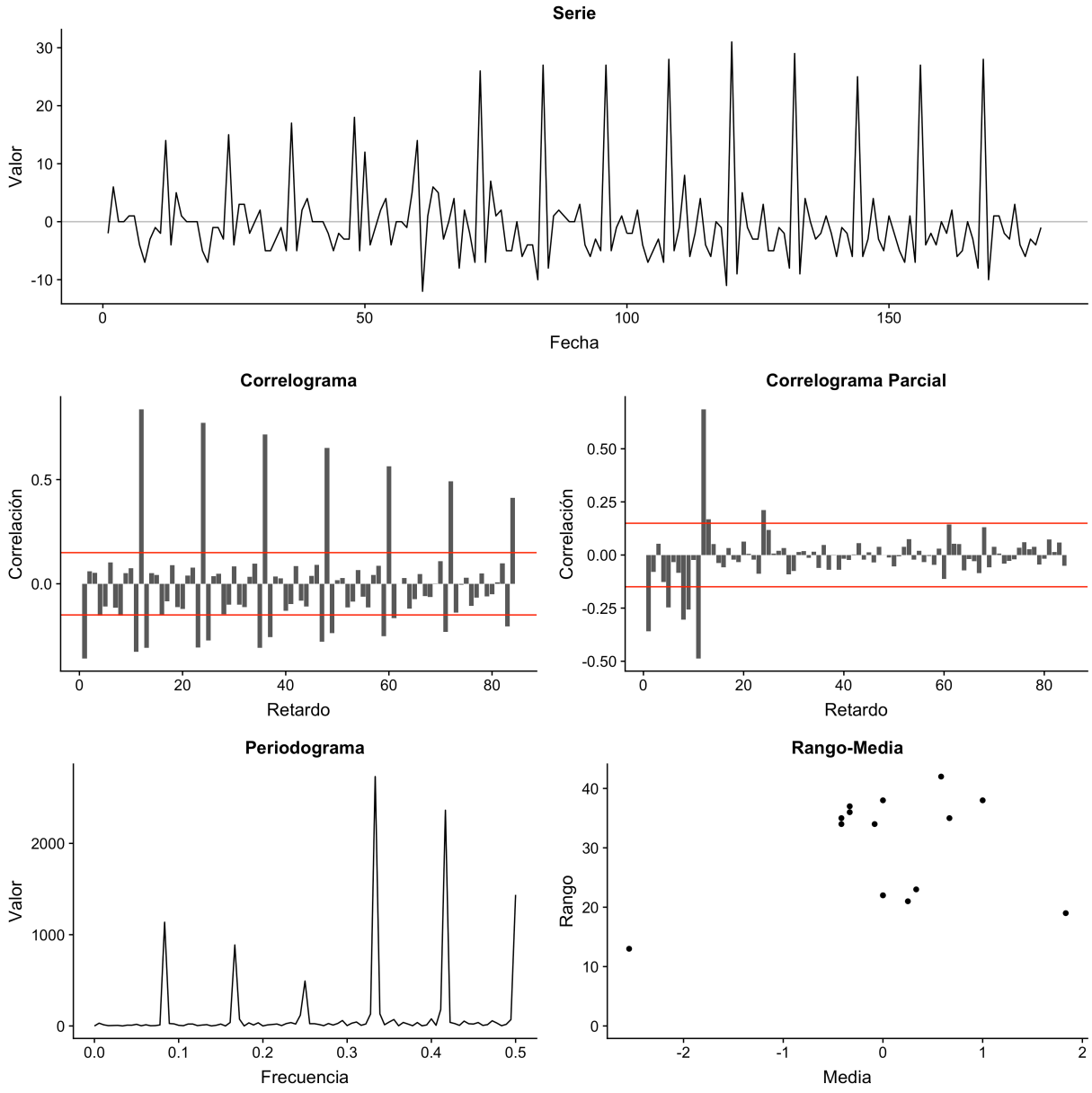

Figura 2: [TODO]

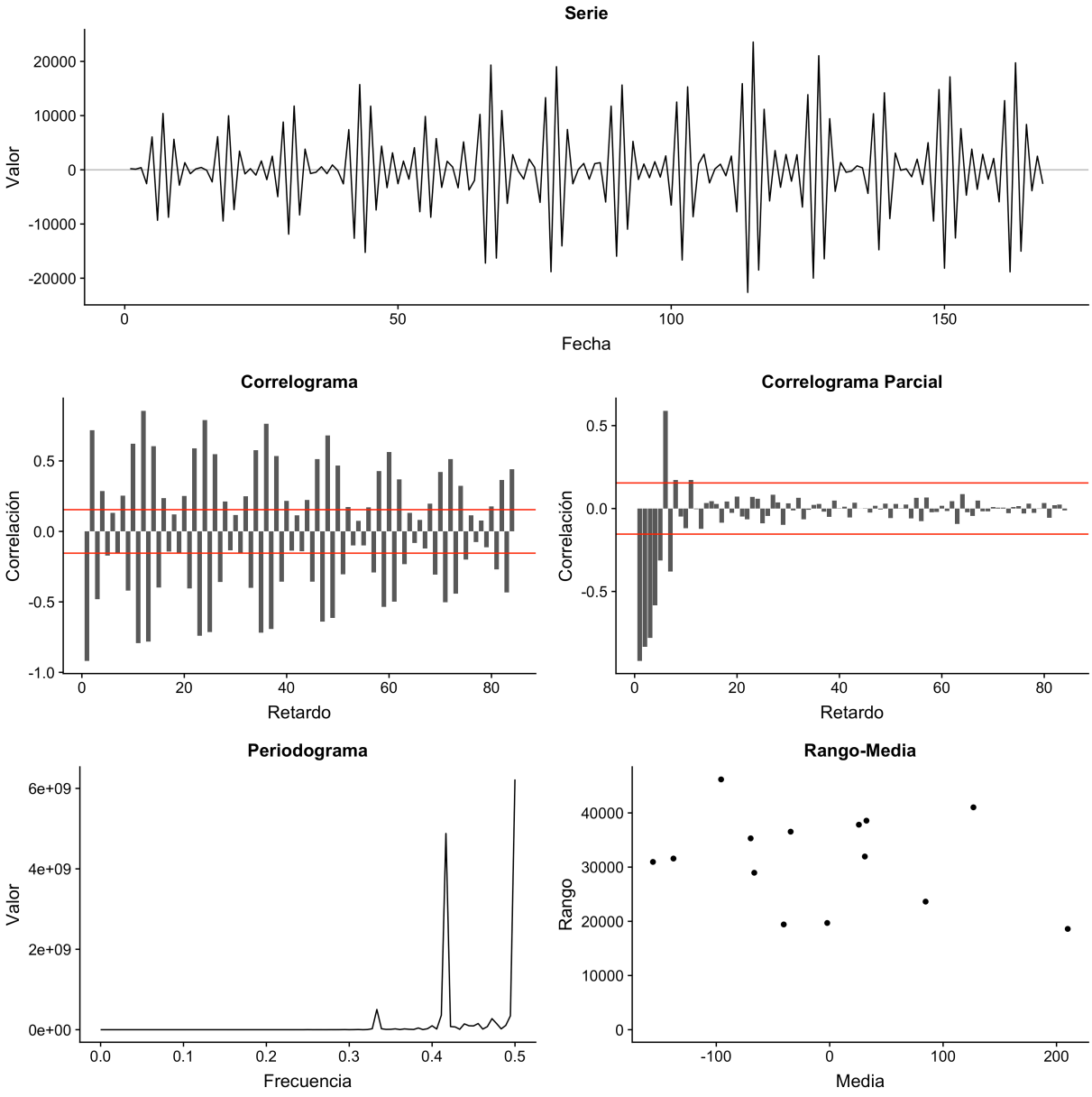

Figura 3: [TODO]

2. Etapa de estimación y validación

[TODO]

3. Comparación de modelos

[TODO]

4. Predicción

[TODO]

A. Código Fuente

[TODO]

```r
## Author: Sergio García Prado
## Title: Time Series - Weight Loss - EDA

rm(list = ls())

library(magrittr)
library(dplyr)
library(ggplot2)
library(latex2exp)
require(reshape2)
library(forecast)
library(cowplot)
library(lubridate)

RangeMean <- function(x, seasonality) {
    n <- length(x)
    seq(1, n, by=seasonality) %>%
    sapply(function(i){
        a <- x[i:(i + seasonality - 1)]
        c(mean=mean(a, na.rm=TRUE), range=diff(range(a, na.rm = TRUE)))
    }) %>%
    t() %>%
    as.data.frame()
}

Correlogram <- function(x, n = length(x) - 1, with.first = FALSE) {
    result <- acf(x, lag.max=n, plot=FALSE)$acf[1:n + !with.first]
    data.frame(lag = 1:length(result), values = result)
}

PartialCorrelogram <- function(x, n = length(x) - 1) {
    result <- pacf(x, lag.max=n, plot=FALSE)$acf
    data.frame(lag = 1:length(result), values = result)
}

Periodogram <- function(x) {
    result <- TSA::periodogram(x, plot=FALSE)
    data.frame(freq = c(0, result$freq), spec = c(0, result$spec))
}

PlotTimeSeries <- function(df, seasonality, armonics = c(), lags = MAX_LAG){
    p.a <- ggplot(df) +
        aes(x = index, y = values) +
        xlab("Fecha") +
        ylab("Valor") +
        geom_hline(yintercept = 0, color = "gray") +
        geom_line() +
        ggtitle('Serie')

    p.b <- ggplot(RangeMean(df$values, seasonality)) +
        aes(x = mean, y = range) +
        geom_point() +
        xlab("Media") +
        ylab("Rango") +
        expand_limits(y=0) +
        ggtitle('Rango-Media')
    p.c <- ggplot(Correlogram(df$values, lags)) +
        aes(x = lag, y = values) +
        xlab("Retardo") +
        ylab("Correlación") +
        geom_bar(stat="identity") +
        geom_hline(yintercept = 2/sqrt(nrow(df)), color = "red") +
        geom_hline(yintercept = -2/sqrt(nrow(df)), color = "red") +
        ggtitle('Correlograma')

    p.partial.correlogram <- ggplot(PartialCorrelogram(df$values, lags)) +
        aes(x = lag, y = values) +
        xlab("Retardo") +
        ylab("Correlación") +
        geom_bar(stat="identity") +
        geom_hline(yintercept = 2/sqrt(nrow(df)), color = "red") +
        geom_hline(yintercept = -2/sqrt(nrow(df)), color = "red") +
        ggtitle('Correlograma Parcial')
    p.d <- ggplot(Periodogram(df$values)) +
        aes(x = freq, y = spec) +
        xlab("Frecuencia") +
        ylab("Valor") +
        geom_line() +
        ggtitle('Periodograma')

    for (a in armonics) {
        p.d <- p.d + geom_vline(xintercept = a, color = "red", alpha = 0.4)
    }
```