Learning Objectives TSM_AdvStDaAn

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Contents

Part I

Week 1

- Review of Multiple Linear Regression
- You know the Maximum Likelihood Principle

Week 2

- You understand Akaike's information criterion (AIC) to select 'important' predictor variables
- You know how to handle categorical predictors (factor variables in R)
- You know what multicollinearity is and how to handle it
- You know how to predict
- You understand cross validation
- You understand the difference between interpolation vs. extrapolation
- You know the difference between predictive vs. descriptive modelling (versus causality) and can explain it

Week 3

- Understand Weighted Least Squares
- You know how Robust Fitting works
- You can fit Smooth Functions and Additive Models
- You know how to approach Statistical Model Building

Week 4

- You know the Logistic Regression Model and its applications
- You know how to fit a Logistic Regression in R
- You know how to interpret the parameter of a Logistic Regression

Week 5

- You know the three elements that define the GLM
- You can identify members of the GLM family
- You know how to fit GLMs in R and know the algorithm underlying it
- You can interpret R output of a GLM fit

Week 6

- You know what deviances are in GLM
- You can understand AIC is generalised to GLMs
- You know when you can apply Wald-type confidence intervals and when it is better to use deviance based confidence intervals
- You can apply the introduced methods in statistical data analysis using R

Week 7

- You know what overdispersion is and can identify it
- You can check the model adequacy
- . . . and determine which model assumptions, if any, are violated

Week 8

- You know what a rate models is and how you can analyse it with GLM
- You know how a quasi model extends a GLM and when you can apply it
- You know that confidence tables can be analysed with an extention of GLM
- You know multinomial and ordinal regression and the difference between these two models
- You can fit these methods to data using R, interpret the results, make inference statements and predictions.