



Session 1

Exploratory data analysis: modelling relationships



Contents

- Course aims and structure
- Objectives
- The modelling framework
- Some linear models with notation



Course aims

Ensure understanding of concepts

Explain statistical jargon: *modelling, parameters, estimates*

Help in interpreting computer output

Go beyond p-values and R^2

Course structure

Presentations of concepts, complemented by

computer-based session to put principles into practice



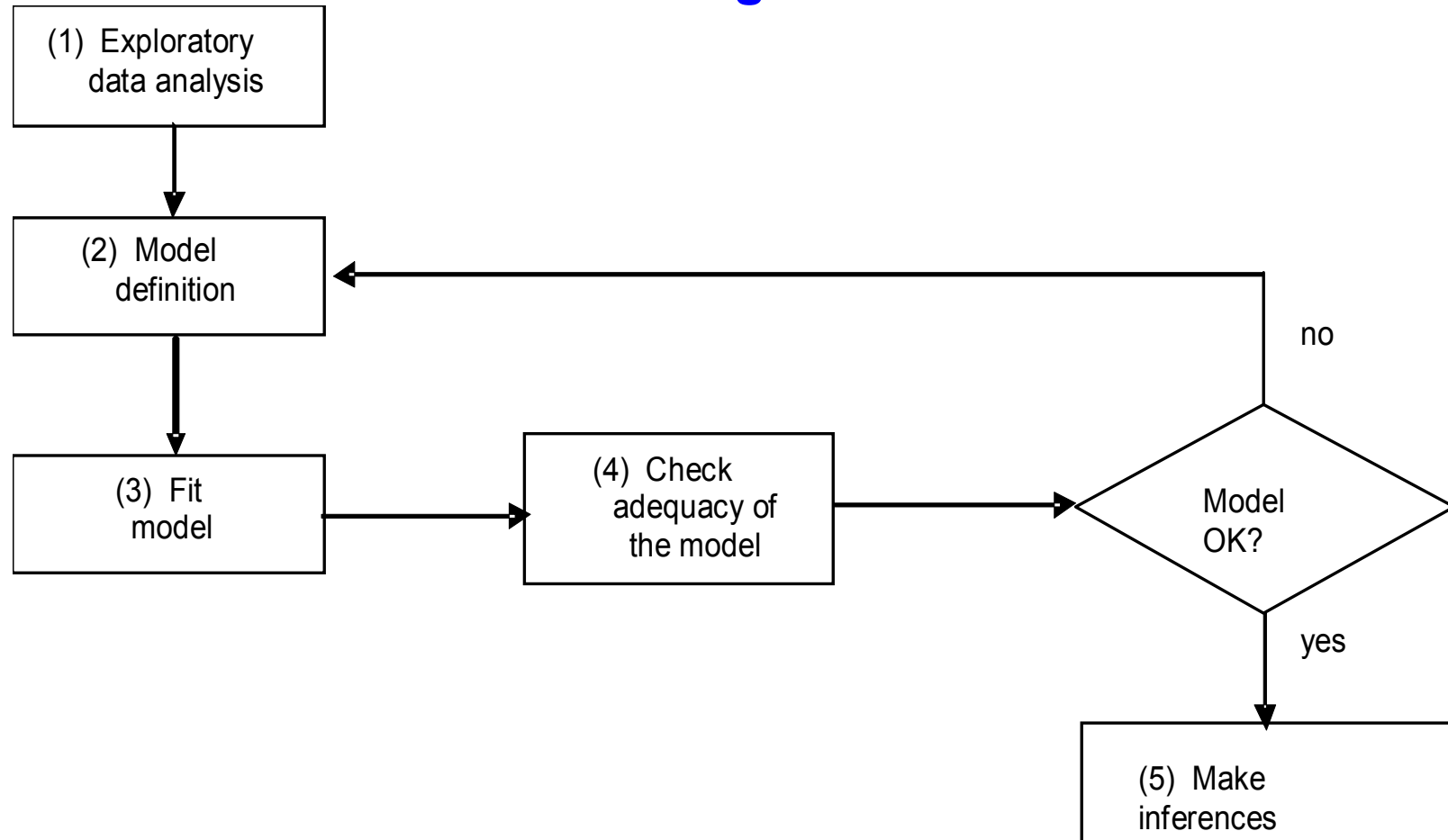
Objectives

Guide you through a modern, sound approach to regression:

1. Produce scatterplots to propose a plausible summary model
2. Choose the form of predictors
3. Let the package do parameter estimation
4. Review the validity of the proposed summary model
5. Interpret results



The Modelling Framework





Some linear models with notation

A straight line

$$y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$$

or more concisely:

$$y = \beta_0 + \beta_1 x + \varepsilon$$

A quadratic curve

$$y = \beta_0 + \beta_1 x + \beta_2 x^2 + \varepsilon$$

A 2-D plane in 3-D space

CAST: 2D plane [ex1](#) [ex2](#)

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \varepsilon$$

A set of parallel straight lines

$$y = \beta_0 + \beta_1 x + F_j + \varepsilon$$