

# Generalized Linear Models

## Introduction and Overview

Prof. Dr. Andreas Groll & Jacob Grytzka

Summer term 2024

# Organizational stuff

**Suitable modules:** BS 14/15; MS 6/7; MD E1 (Methods); ME 7

## Lecture

- ▶ inverted classroom with online videos
- ▶ Q&A session on Wednesday, 12-13 pm, lecture room: CT/ZE 01

Andreas Groll ([groll@statistik.tu-dortmund.de](mailto:groll@statistik.tu-dortmund.de))

## Exercise

- ▶ date & room TBA

Jacob Grytzka ([jacob.grytzka@tu-dortmund.de](mailto:jacob.grytzka@tu-dortmund.de))

# Organizational stuff

## Website

<https://moodle.tu-dortmund.de/course/view.php?id=44739>

Enrollment key: GLM\_SoSe\_24

## Quiz

- ▶ Date: TBA, in physical presence

## Exams

- ▶ 1st date: 26.07.24, 9:00-11:00, rooms Chemie HS1-3
- ▶ 2nd date: TBA

# Goals of this course

## **Get familiar with advanced regression techniques**

- ▶ Generalized regression models to analyse panel data
- ▶ Categorical regression
- ▶ Variable selection via penalization
- ▶ How to deal with longitudinal data

## **Learning objective: Acquire competences ...**

... to choose, compare and interpret suitable models for a given data situation.

# Content

- ▶ Based on the course from Annika Hoyer (and colleagues, LMU Munich)
- ▶ No complete manuscript, but:  
⇒ video lecture: a mixture out of slides & hand-written parts;  
Q&A sessions

## Literature

- ▶ Fahrmeir, Kneib, Lang, Marx (2022): Regression: Models, methods and applications. Berlin. Springer-Verlag (3rd edition)
- ▶ Fahrmeir, Tutz (2013): Multivariate statistical modelling based on generalized linear models. Springer Science & Business Media
- ▶ Tutz (2011): Regression for categorical data. Cambridge University Press
- ▶ Eilers, Marx (2021). Practical smoothing: The joys of P-splines. Cambridge University Press.

# Course overview

## 1. Basic concepts of regression

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2. Binary regression

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2. Binary regression
3. Generalized linear models



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4. Multi-categorical regression

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5. Semi- and non-parametric regression

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1. Basic concepts of regression
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3. Generalized linear models
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5. Semi- and non-parametric regression
6. Multivariate/ extended regression models