Generalised Linear Models - Introduction

Why Generalised Linear Models (GLMs)?

Linear models suppose that we have observations

$$Y \sim N(X\beta, \sigma^2 I).$$

Can we use linear models for genetic case-control study?

Table: Data: Type 2 Diabetes example

Sample id	Y_i	X_i
1	type 2 diabetes	CC
2	no type 2 diabetes	CC
3	no type 2 diabetes	CT
4	no type 2 diabetes	TT
. . .	. . .	. . .
2000	type 2 diabetes	CC

Y_i : no type 2 diabetes $\rightarrow$ 0
type 2 diabetes $\rightarrow$ 1

X_i : CC $\rightarrow$ 0
CT $\rightarrow$ 1
TT $\rightarrow$ 2

GLMs allow for non-normal Y!

Generalised Linear Models - Outline

- Binomial regression
- Exponential families
- Generalised linear models (GLMs)
- Quasilikelihood and overdispersion