

Chapter 1

A Simple, Linear, Mixed-effects Model

In this book we describe the theory behind a type of statistical model called *mixed-effects* models and the practice of fitting and analyzing such models using the `lme4`

the estimate of this parameter is 1527.5 g (equality is again a consequence of the simple model and balanced data set). The standard error of the intercept estimate is 19.38 g for the REML fit and 17.69 g for the ML fit.

An estimate of 0 for σ_1 does not mean that there is no variation between the

In Sect. 1.5 we introduce a method of assessing variability in parameter estimates using the “profiled deviance” and in Sect. 1.6 we show methods of characterizing the conditional distribution of the random effects given the data. Before we get to these sections, however, we should state in some detail

$$\Sigma_{\theta} = \sigma^2 \Lambda_{\theta} \Lambda_{\theta}^{\top}. \quad (1.2)$$

The *spherical random effects*, $U \sim N(0, \sigma^2$

Fig. 1.3 Image of the relative covariance factor, Λ_{θ} for model fm1ML

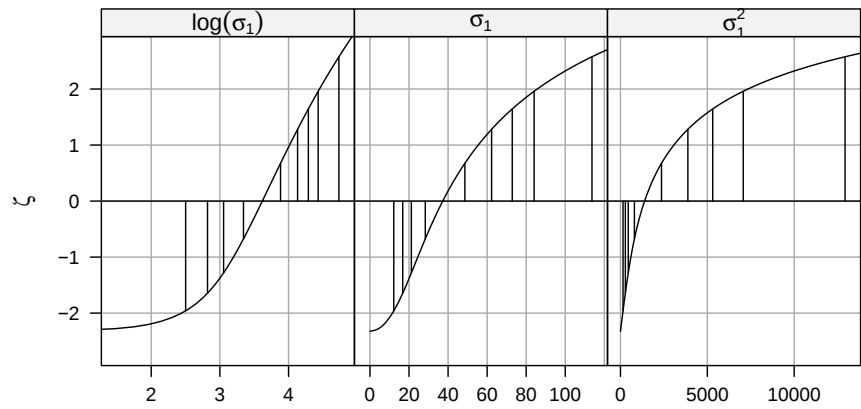


Fig. 1.8 Signed square root, ζ , of the likelihood ratio test statistic as a function of $\log(\sigma_1)$, of σ_1 and of σ

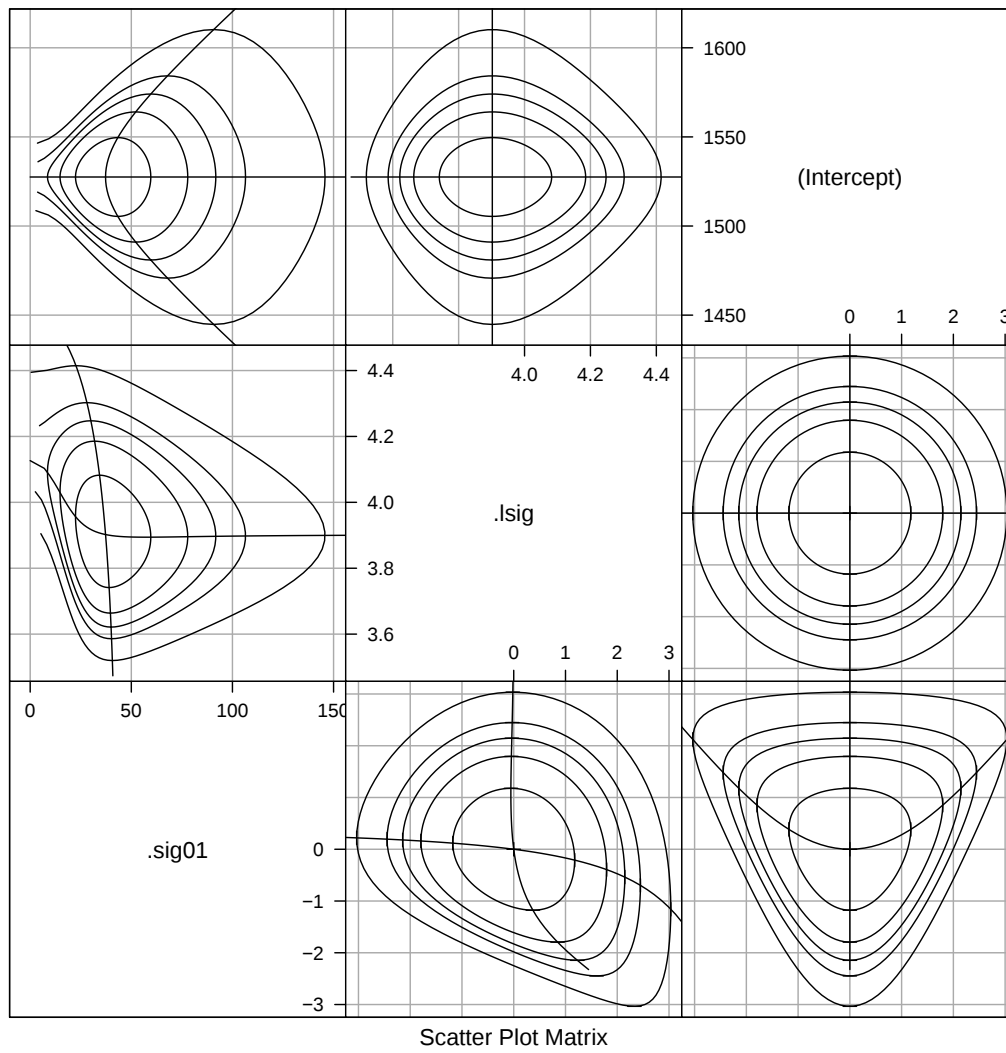


Fig. 1.9 Profile pairs plot for the parameters in model

on the vertical axis versus $\zeta(\beta$

1.7 Chapter Summary

A considerable amount of material has been presented in this chapter, espe-

