

## 0.1 Carstensen Methods

Bendix Carstensen et al. proposed the use of LME models to allow for a more statistically rigorous approach to computing Limits of Agreement. The respective papers also discuss several shortcomings for techniques for dealing with replicate measurements, as proposed by Bland-Altman 1999.

Components

Carstensen's LME model

LoA as computed by Carstensen's LME model

Papers

Carstensen et al 2006

Carstensen et al 2008

Bendix Carstensen 2010

Bendix Carstensen 2010

Section 5.3 Models for replicate measurements

Section 7 A general model for method comparisons.

Section 7.2 Interpretation of Random effects

Section 5.3 Models for replicate measurements

Section 5 Replicate measurements.

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air extra random effect that does not depend on method.

It is treated as an extension of i.

The variance of air represents the variation between replication condition (common

$$ymir = m + i + cmi + emir$$

$$cmi = N(0, m2)$$

$$emir = N(0, m2)$$

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$$\text{var}(y_{10}-y_{20}) = 12+22+12+22$$

$$1-2222+12+22$$

Roy further to Carstensen

$$ymir = m + i + cmi + emir$$

Section 7 A general model for method comparisons.

Carstensen discusses the model and its use as if all parameter estimates are available.

In this model, intermethod bias is assumed to be constant at all measurement levels.

$i$  : True value for item  $i$

The parameter  $i$  can be thought of as the underlying, but unobtainable, true measurement for item  $i$ .

$m$ : Fixed effect for method  $m$

## 0.2 7.2 Interpretation of Random effects

- method by item

- item by replicate
- method by item by replicate