

Breakdown and Groups Revisited

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Keywords: Breakdown, Equivariance.

Abstract

The notion of breakdown point was introduced by Hampel (1968, 1971) and developed further by among others Huber (1981) and Donoho and Huber (1983).

In Davies and Gather (2005) it was argued that the success of the concept is connected to the existence of a group structure on the sampling space and the linking of breakdown and equivariance. However, as was also argued there, equivariance is not sufficient to make the breakdown point a useful concept in the sense that a meaningful upper bound exists for it. We will present some examples, such as logistic regression, correlation models, and others to illustrate this.

Moreover, we will discuss the situation where there are no "banned" parameter values (such as ∞ in the case of location or 0 and ∞ in the case of scale), but where one may nevertheless wish to have some concept of breakdown. Immediate examples are directional data (Mardia (1972), He and Simpson (1992)) and principal component analysis. We will give an additional definition of breakdown which applies to such situations.

The talk reports joint work with P.L. Davies.

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