



Comparison of the AMS ellipsoid reliability by Linear Perturbation Analysis and parametric bootstrap: single-specimen example

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Weak magnetic materials whose bulk susceptibility values or susceptibility semiaxis difference are close to the instrument accuracy show large errors in the direct evaluation of their ellipsoid parameters. This may lead to misinterpretation of the magnetic fabric of natural outcrops, the determination of single crystal properties or correlation with structural parameters. Two solutions are possible i) increase the number of samples, which is very often not possible, or ii) compute the magnetic fabric ellipsoid with an exhaustive statistical analysis. Within the available statistical methods, the Bootstrap technique has been widely used since it was first introduced in rock magnetism in the early 90's. We propose a complete study about how the final result depends on the details of statistical methods. We have made simulations for Linear Perturbation Analysis and parametric bootstrap method by variations of i) number of measurements for each of the positions in manual AMS measurement scheme, ii) the instrumental error and iii) the shape and the degree ellipsoid of the sample. The results show that both methods are not reliable when the eigenvalues are too close in relation to the instrumental error.