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**Bias reduction in the two-stage method for degradation data analysis.** (English) Zbl 07193035  
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**Summary:** Degradation data are usually collected for assessing the reliability of the product. We propose a new two-stage method to analyze degradation data. The degradation path is fitted by the nonlinear mixed effects model in the first stage, and the parameters in lifetime distribution are estimated by maximizing the asymptotic marginal distribution of pseudo lifetimes in the second stage. The new method has many advantages: (i) it does not require the distributions on random effects, (ii) the historical information about lifetime distribution of the product can be incorporated easily, and thus the estimated lifetime distribution has a closed form, (iii) bias correction term is automatically embedded into the asymptotic marginal distribution of pseudo lifetime. Finally, simulation studies and real data analysis are performed for illustration.

**MSC:**

- 62 Statistics
- 65 Numerical analysis

**Keywords:**

degradation data; random effects; stochastic process; general path model; bias reduction

**Software:**

MEMSS; SPLIDA; S-PLUS

**Full Text:** [DOI](#)

**References:**

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