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Greenfield Challenge - Efficient sampling plans for utility meter surveillance

Wednesday, 30 September 2020 17:00 (30 minutes)

Inspections according to statistical sampling plans allow conclusions to be drawn about the reliability of a whole population of e.g. measurement devices. However, confirming high reliability levels requires large sample sizes and is thus expensive or even infeasible.
When reliability is judged by not exceeding a certain threshold, considerably more efficient attribute sampling plans can be implemented. Specifically for location-scale distributed continuous variables, we proved that if 100q% of a population meets a tighter threshold Δ, then at least 100p% of the same population meets threshold $\Delta\gamma$ (with $0<q<p<1$, $\gamma>1$). Consequently, verifying the conformance of a smaller portion q of devices, requires smaller sample sizes and retains the simplicity of attribute sampling.
We communicated this and related research to verification authorities, testing laboratories and the wider legal metrology community. As a result, procedural instructions were published which enforce a new regulation in the German Measures and Verification Ordinance, affect millions of in-service utility meters in Germany and ensure 95% conforming utility meters –not only at testing but continuously.
This talk is based on joint work with Clemens Elster (PTB).

Short biography:
Katy Klauenberg is a statistician in the working group "Data analysis and measurement uncertainty"at Germany's national metrology institute PTB (Physikalisch-Technische Bundesanstalt). Her research focusses on statistics in the science of measurements and includes Bayesian methods, regression problems and sampling procedures. She organizes a biannual seminar and provides training and support for the evaluation of measurement uncertainty. Katy is a mathematician by training, received her PhD in the field of statistical image processing and was a postdoc in Sheffield's Probability and Statistics department before joining PTB in 2009.

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