

The Allan Variance
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Abstract

The seminar addresses the estimation of the error bars in the Allan variance, and explains why the upper half-bar in the log-log ADEV plot is bigger than the lower half-bar (while it is a common belief that the lower half-bar is bigger).

Outline

- Practical Allan variance algorithms (with / without overlapping)
- Allan variance versus Allan deviation
- Statistics of the Allan variance and the Allan deviation: chi-squared and Rayleigh distribution
- How to estimate the number of equivalent degrees of freedom (edf) of an Allan variance/deviation measure?
- Probability Density Function and Cumulative Distribution Function of the Allan variance/deviation measures
- Confidence interval over the Allan variance/deviation measures
- Fitting curve over Allan variance measurement
- Link between noise levels and Allan variance response
- Estimation of the noise levels and their uncertainty from the fitting curve
- Extrapolation to very long term time stability
- How to increase the number of edf: the Total variance
- Generalization to the other variances.