

vol #5

EpiNet®'s “Algorithm Deep-Dive” series

Learn how to analyze your in-situ data most efficiently



Fig. 1: Analysis screen of EpiNet® applying the “Slope” of the “Basic Math” package for deducing the gradient of the wafer curvature evolution from the curvature data line during the process step marked in red.

Algorithm profile

Algo name: “Basic Math” algorithm package

Short description:

- The functionalities of the “Basic Math” package are particularly useful for a purely empirical analysis of epitaxial run data obtained with LayTec’s EpiTT and EpiCurve® TT.
- This can e.g. be appropriate, if two runs shall be compared to each other or if material properties are (partially) unknown.
- It allows to apply simple mathematical and statistical data analyses.
- Within this package, the BasicStatistics function can be used for calculating the following parameters of a certain amount of data (e.g. a fraction of a transient):
 - Average
 - Maximum
 - Minimum
 - Median
 - Standard Deviation
- All these values can be calculated either in one step or individually.
- In addition, it is also possible to calculate the Slope of a part of a transient.

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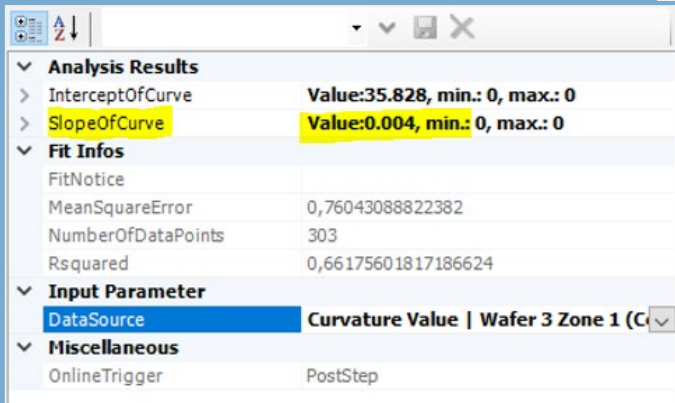


Fig. 2: Results window displaying the slope value deduced from the process step marked in Fig. 1.

Algorithm profile

- The package also contains the sub-package Data Processing consisting of multiple methods to manipulate data. Within this package, the user can choose between the following six data processing methods, of which some may have one additional input parameter:
 - AdvancedNoiseReduction (removing noise from a transient)
 - Shifting (shifting a transient by a certain time period)
 - Multiply (scaling a transient with a chose factor; for reflectance, the condition $0 < R < 1$ still needs to be fulfilled)
 - MedianFilter (filtering noise by replacing a certain number of data points by their median)
 - SpikeRemoval (removing spikes from transients)
 - DriftCompensation (compensating linear drifts of a transient)

Usage Ideas and Alternatives:

Some examples for application of the above mentioned functionalities include among others:

- Applying DriftCompensation for eliminating the superimposed drift caused by roughness from a transient and thus, enabling growth rate fitting of the oscillations. Alternatively, it can be used for making the growth rate (oscillation period) of two identical runs experiencing different slopes comparable.
- Applying AdvancedNoiseReduction or MedianFilter for reducing noise and thus enabling a more precise growth rate fitting.
- Applying Shifting to compare two identical process steps from two runs, for which the preceding steps have been carried out at different growth rates.

User instructions can be found in the manual and can be obtained via info@laytec.de.

Reference data is available within EpiNet®.