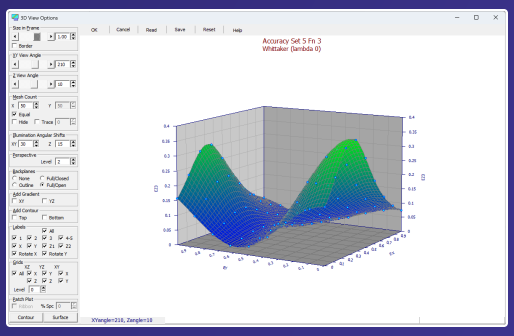
R²N SOFTWARE · TABLECURVE 9

TableCurve 3D

version 9.0



Automated surface fitting and equation discovery

Stop guessing which surface fits your data.

TableCurve 3D searches a space of 453 million candidate surfaces and, in a full run, fits 37,365 equations to your XYZ data and ranks every one. Release 9 adds a 64-bit engine, a 128-bit precision solver, built-in AI guidance and a Python-callable fitting DLL.

TableCurve 3D v9.0

The ninth-generation release: rebuilt 64-bit for Windows 10 and 11, with Matplotlib colormaps, nine scattered-data gridding algorithms and twelve code-generation languages.

SURFACE FITTING WITHOUT THE GUESSWORK

Find optimum equations to describe empirical data

TableCurve 3D gives scientists and engineers the power to find the ideal model for even the most complex data, including equations that might never have been considered. Surface fitting is where nominating a model by eye breaks down completely: the interaction between two variables rarely looks like anything you would think to try, and the difference between a saddle, a ridge and two separate modes is not something a contour plot settles. So TableCurve 3D fits the library and lets the statistics argue.

TableCurve 3D's built-in equation set includes:

- Linear equations and selective-subset linear surfaces

- Polynomial and rational functions, to order 65
- Logarithmic and exponential functions
- Nonlinear peak functions
- Nonlinear transition functions
- Nonlinear exponential and power equations
- Robust plane equations
- User-defined functions (up to 15)

> *"I have tried other products including my own programs and I can truthfully say, there is no competition to the TableCurve Programs."*
>
> **Patrick Lestrade**
>
> Professor of Physics, Mississippi State University

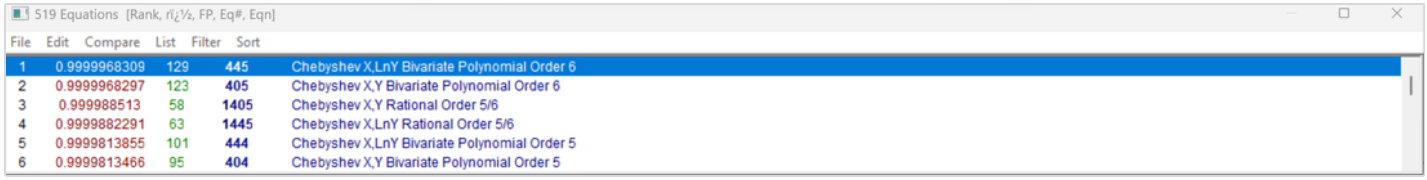
State-of-the-art surface fitting not found in other packages

- In addition to standard least squares minimization, TableCurve 3D's non-linear engine is capable of three different robust estimations: least absolute deviation, Lorentzian minimization and Pearson VII Limit minimization.
- A **128-bit extended-precision solver** carrying 38 significant digits, for high-order polynomial and rational surfaces that lose conditioning at ordinary double precision.
- Option to change the maximum number of terms permitted when fitting linear equations.
- On systems that support multi-threading, TableCurve 3D's Background Thread Processing option allows fitting to occur without any form of user input.
- Option to set the default term significance anywhere from 1 to 15.
- **Built-in AI guidance** that hands your fitted surface, its statistics and its residual pattern to Claude for a second opinion.

Automation takes the trial and error out of surface fitting

Using its selective subset procedure, TableCurve 3D will fit **37,365 equations** in a full run — 36,582 best-subset surfaces chosen from a space of 453,687,714 candidates, plus 311 polynomials, 300 rationals and 172 nonlinear models — or just the ones you need. With TableCurve 3D, a single mouse click is all it takes to start the automated surface fitting process; there is no set up required. You can even enter your own specialty models to be fit and ranked along with the built-in equations. TableCurve saves you precious time because it takes the endless trial and error out of surface fitting.

The subset space is built from 2 to 8 terms drawn from a pool of 42 basis functions, across three z-transforms. At two terms every candidate is fitted; above two terms the search keeps the best subsets — 12,194 per transform at the default order. Prefer something quicker? The simple preset fits 2,592 equations in a fraction of the time.



Every fitted surface is ranked and plotted. Sort by r^2, DOF-adjusted r^2, fit standard error or the F statistic, and the surface graph follows your selection as you scroll the list.

Fit user-defined functions

Up to 15 user-defined equations can be entered and ranked along with the built-in equations. These specialized models can contain most mathematical constructs, including special functions, series convergence and conditional statements, differentiations, integrations and parameter constraints. TableCurve 3D even offers the option of graphically adjusting equation parameters to assure convergence for the fit of user-defined models. Unlike most surface fitting programs, TableCurve 3D's user-defined functions are compiled so they can be fitted at nearly the speed of the built-in equations. For maximum flexibility, TableCurve 3D gives you the option to save your functions as individual files, in libraries or both.

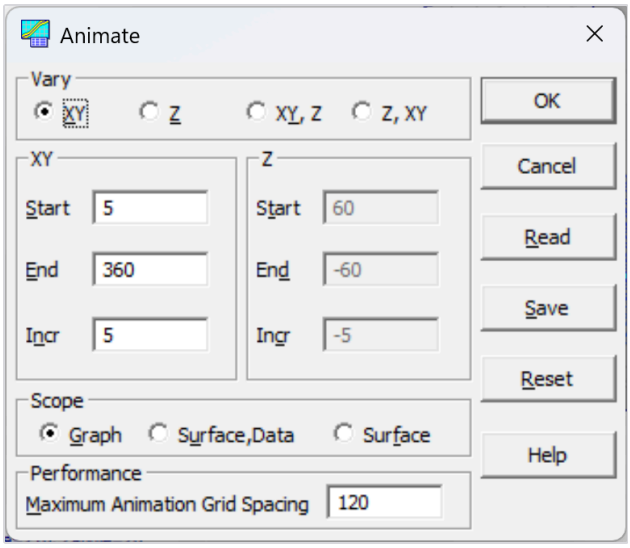
REVIEW AND VISUALIZE

Visually discover the best equation to model your data

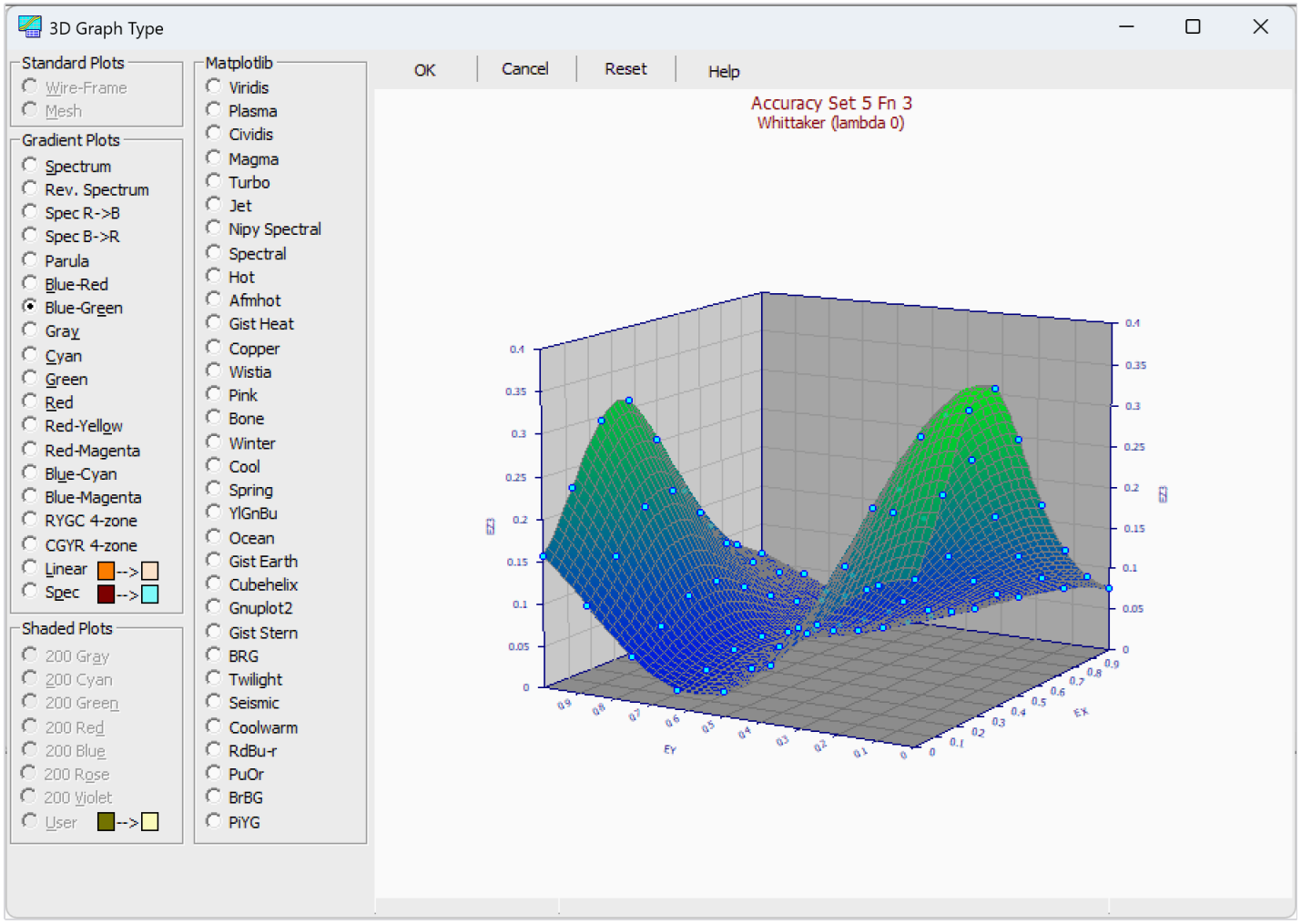
Graphically review surface fit results

Once your XYZ data have been fit, TableCurve 3D automatically sorts and plots the fitted equations by the statistical criteria you select (r^2, DOF adjusted r^2, fit standard error or the F statistic). Graphically review the fitted results as you scroll through the equation list. A 3D residuals graph as well as parameter output are generated for each fitted equation. Add confidence or prediction intervals to the graph to detect outliers in your data. You can also automatically display a 2D contour plot on the top and bottom of the surface fit graph to get another view of your data. Data, statistical and numeric summaries are also available from within the Review Surface Fit window so you can further analyze fit results.

Viewing a surface fit from all angles is imperative in determining whether or not a given fit is accurate. Using a simple interface, TableCurve 3D lets you view a graph from any angle. It will even animate the graph automatically in a specified XY and/or Z angle sequence. Just sit back and observe every nuance within the fit.



Full animation of fitted surfaces — set an XY and Z angle sequence and let the surface turn while you watch for structure that a single viewing angle conceals.



Release 9 adds the full Matplotlib colormap family — Viridis, Plasma, Cividis, Magma, Turbo, Coolwarm, Twilight and more — alongside the classic spectrum, four-zone and shaded renderings. Every change renders in real time.

Flexible output options

Output TableCurve 3D's publication-quality graphs in black and white or color, portrait or landscape. You can also produce files containing data and equations in Excel, ASCII and SigmaPlot formats. TableCurve 3D can speed up your programming by generating actual function code and test routines for all fitted equations in twelve languages.

Powerful, and still easy to use

TableCurve 3D takes full advantage of the Windows graphical user interface to simplify every aspect of operation — from data import to output of results. Import data from many popular file formats including Excel, SigmaPlot, Lotus and ASCII. Once your data are in the TableCurve editor, start the automatic fitting process with a single mouse click. Choose to fit all equations, select a group of equations or create a custom equation set. All equations are readily available from the grouped toolbars or TableCurve's Process menu. You can even set up TableCurve 3D to begin fitting the moment data are imported or modified with Background Thread Processing Fitting. Users consistently comment that — out of the box, without reading the instructions — TableCurve is highly intuitive, easy-to-use and remarkably simple to learn.

RELEASE 9

What's new in TableCurve 3D 9.0

A 64-bit engine

The entire program has been rebuilt as a native 64-bit application for Windows 10 and 11. The fitting engine, subset search, solver and renderer are compiled for x64, and the program runs without compatibility shims on current hardware.

Matplotlib colormaps

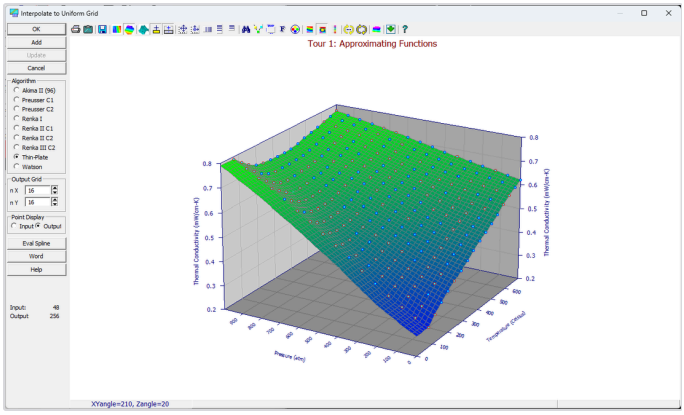
Release 9 adds the complete Matplotlib colormap family to the gradient renderer — Viridis, Plasma, Cividis, Magma, Turbo, Jet, Spectral, Coolwarm, Twilight, Cubehelix and the rest. Perceptually uniform maps such as Viridis and Cividis matter for surface work: they do not invent ridges where the data has none, and they remain readable in greyscale print and to colour-blind readers.

128-bit precision solver

The extended-precision math engine is now a 128-bit implementation carrying 38 significant digits, rewritten in portable C for 64-bit targets. High-order polynomial and rational surfaces that lose conditioning at double precision resolve cleanly.

AI guidance built in

Ask the program about the surface in front of you. TableCurve 3D packages the selected equation, its coefficients, its statistical summary and its residual surface and hands them to Claude, so the answer concerns your experiment rather than surface fitting in general.



Nine scattered-data gridding algorithms — Akima II, Preusser C1 and C2, Renka I, II C1, II C2 and III C2, Thin-Plate and Watson — with the input and output point counts reported as you work.

Twelve code-generation languages

Release 9 adds **Python**, **R** and **Maple**, bringing the surface code generator to the same twelve languages as TableCurve 2D: C (64-bit), C (80-bit), C++, Fortran 77, Fortran 90, Java, MATLAB, Pascal, Visual Basic (VBA), Python, R and Maple. Code is available for every built-in equation, including every subset surface.

Grouped toolbars

The toolbars are organised by task with a caption printed under each group, so the process verbs read as named sets rather than an undifferentiated strip of icons.

A project tree that remembers

Up to 25 data sets are open at once in a tree-structured explorer, each carrying its own surface fits, graphs, generated code and processing instructions. The state of the tree is saved across sessions, so you resume where you stopped without re-importing anything, and because only references to the data are saved, changes made externally in the data sources are reflected on import.

Advanced evaluation

Evaluation sequences are saved across sessions and can be saved to disk. The precision of output and the various confidence levels can be set on the fly, and all sequences are automatically updated when changing equations. Sort columns or export the table to Excel, Word, or other applications.

Unattended batch fitting of multiple data sets

For those instances where large numbers of similar data sets must be fitted to a specific model, or pre-processed through a specific procedure, TableCurve 3D offers an easy-to-use Excel-based automation. Simply place all data sets within an Excel file and in one click process hundreds or even thousands of data sets against a given surface-fit equation or non-parametric procedure. The graphs in full vector-based resolution and all reports can be streamed to an MS Word (or generic RTF) file, while all numeric information is written to a new Excel file.

NEW IN RELEASE 9 · FOR INSTRUMENT MAKERS AND AUTOMATED PIPELINES

Put the TableCurve 3D engine inside your own software

The surface-fitting engine ships as a documented DLL with a flat, caller-allocated C API. It loads directly from Python through `ctypes`, with no wrapper to build, and from any language that can call a C function. Your code loads an XYZ data set, runs the surface search, and reads back the ranked results, fitted parameters and fitted surface, without the user interface ever opening.

Instrument manufacturers

Turn any instrument that produces 3D data into one that also delivers a fitted, ranked response-surface model.

Automated pipelines

Fit surfaces from a script, a LIMS or a test rig, with the same engine and the same ranking as the desktop program.

Research code

Call TableCurve 3D from Python alongside NumPy and pandas, and keep surface discovery inside a reproducible workflow.

APPLICATIONS

Surfaces for every application

Optimize a process over two variables…

Yield, purity or strength usually depends on two settings at once, such as temperature and pressure, or concentration and time. Fit the response surface, then read the optimum from the reported minima and maxima and the partial derivatives in the evaluation table.

Model designed experiments…

Response-surface work from a designed experiment gets the whole equation library rather than a single quadratic, with term significance and confidence limits for every candidate.

Map dose and interaction effects…

Where two agents, two stresses or two doses act together, the fitted surface shows the interaction

Calibrate sensors with a second input…

Many sensors drift with temperature, humidity or supply voltage. A fitted surface gives a single compensating equation, ready for generated code in the instrument's firmware.

Convert two-way tables into equations…

Thermophysical property tables, look-up tables and handbook data indexed by two variables become compact equations. The precision summary shows how many significant digits the fit preserves, which matters for fixed-point and embedded code.

directly: ridges, saddles and plateaus that no single-variable curve reveals.

Grid and smooth scattered measurements…

Field, survey and sampling data rarely fall on a grid. Nine scattered-data gridding algorithms produce a uniform surface for visualization, comparison or further fitting.

USED IN PUBLISHED RESEARCH

TableCurve 3D in the literature

A selection of peer-reviewed studies that report fitting their data with TableCurve.

Influence of interannual climate variability on wheat quality during long-term storage

Poetelea DP et al. *Foods* 15: 2726 (2026)

FOOD SCIENCE · 3D

3D strength surfaces for ankle plantar- and dorsi-flexion in healthy adults

Hussain SJ, Frey-Law L *Journal of Foot and Ankle Research* 9 (2016)

BIOMECHANICS · 3D

Measurement of water vapor condensation on apple surfaces during controlled atmosphere storage

Linke M et al. *Sensors* 23: 1739 (2023)

SENSOR CALIBRATION · 3D

Experimental study on electrical conductivity of several [C4mim][BF4] ionic-liquid-based nanocolloids

Chereches EI, Minea AA *Nanomaterials* 13: 1224 (2023)

MATERIALS SCIENCE · 3D

More published applications: r2nsoftware.com/knowledgebase/tablecurve

GET STARTED

Try TableCurve 3D on your own data

Download a free trial from our website, or contact our sales team for pricing, academic and volume licensing, upgrades from earlier versions, and integration of the fitting DLL.

TRIAL r2nsoftware.com/trial-download

SALES sales@r2nsoftware.com

PHONE +1-630-635-5957

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SPECIFICATIONS

TableCurve 3D 9.0 Features

- New in TableCurve 3D 9.0

INTERFACE

- Native 64-bit application for Windows 10 and 11
- Grouped toolbars with printed group captions
- In-app AI guidance: hands the fit, its statistics and its residuals to Claude
- Tree-structured project explorer, up to 25 data sets open at once
- Project state saved across sessions; resume without re-importing
- Better Review organization with predefined tiling options; layouts saved to disk
- Multitasking with background thread surface-fit options
- Fully customizable 3D surface graphs, including gradient and shaded plots

DATA INPUT

- Native .xlsx worksheet import new
- Up to 16,384 points in data table
- 16.4 million points can be filtered into table using averaging digital import filter
- File types: ASCII, Excel, Lotus, Quattro Pro, SigmaPlot, dBASE, DIF
- Graphical XYZ column selection with import preview
- Weights optionally assigned

DATA MANAGEMENT

- Nine scattered-data gridding algorithms: Akima II, Preusser C1, Preusser C2, Renka I, Renka II C1, Renka II C2, Renka III C2, Thin-Plate and Watson new
- User-specified output grid resolution with input and output point counts reported new
- Graphical and numerical sectioning; graphically enable or disable data points
- Apply calculations to X, Y, Z and Weight values
- Spreadsheet-like data editing with optional graphing of data as they are being entered
- Gridded data smoothing procedures

SURFACE-FITTING

- 453,688,497 built-in equations in the catalogue: 453,687,714 subset surfaces plus 783 polynomials, rationals and nonlinear models new
- 37,365 equations fitted in an All Equations run: the 36,582 best subset surfaces for your data plus all 783 others new
- Subset space built from 2 to 8 terms drawn from 42 basis functions, across 3 z-transforms
- 311 polynomials new
- 243 basic polynomials: x, ln x and 1/x crossed with y, ln y and 1/y, including Taylor series forms
- 9 Chebyshev bivariate and 27 Chebyshev-ln polynomials
- 9 cosine series and 9 sigmoid series polynomials
- 10 Fourier series and 4 Fourier bivariate polynomials
- 300 rationals new
- 256 basic rationals: x and ln x crossed with y and ln y
- 4 Taylor rationals; 10 Chebyshev and 30 Chebyshev-ln rationals

- 172 nonlinear equations
- 72 3D nonlinear peak equations: Gaussian, Lorentzian, log-normal, logistic and extreme value families, plus mixed Gaussian/log-normal forms
- 72 3D nonlinear transition equations: GaussCum, LorCum, LogNormCum, sigmoid, ExtrValCum and LDR families
- 24 3D nonlinear exponential and power equations
- 4 robust plane equations: least squares, least absolute deviation, Lorentzian and Pearson VII limit

FIT CONTROL AND PRECISION

- Maximum polynomial and rational order 65
- 128-bit extended-precision solver, portable C implementation new
- Up to 80 fitted parameters per equation
- Simple preset fits 2,592 equations for a fast first look
- Term significance adjustable from 1 to 15
- User customizable equation sets
- Full control of fit process, including goodness of fit criteria, minimization, and other options
- Three robust fitting methods available for all nonlinear equations and user functions: least absolute deviation, Lorentzian minimization and Pearson VII limit minimization
- Levenberg-Marquardt nonlinear optimization; singular value decomposition for ill-conditioned systems

USER-DEFINED FUNCTIONS (UDFS)

- UDF editor with push button help for inserting functions
- UDFs automatically compiled for speed
- Up to 15 UDFs can be fit at one time, each with up to 10 adjustable parameters
- Graphical UDF adjustment procedure for refining starting estimates
- UDFs can be saved as libraries
- Expression parser with more than 200 mathematical, statistical and special functions

SURFACE-FIT ANALYSIS AND OUTPUT

Numerical

- Evaluation option with automated table generation, includes function, partial derivatives, roots, and cumulative volume; save evaluations to disk; evaluations are updated whenever an equation or algorithm is changed
- Full numeric and statistical summary, including coefficients, standard error, confidence limits, ANOVA, goodness of fit, measured function minima and maxima
- Data summary with predicted values, residuals, and confidence/prediction limits
- Precision summary and term significance analysis across 17 precision levels

Graphical

- Full Matplotlib colormap family — Viridis, Plasma, Cividis, Magma, Turbo, Jet, Spectral, Coolwarm, Twilight, Cubehelix and more new
- Surface-fit graph with customizable layout, backplanes, labels, grids, scaling, points, font, titles and resolution
- Classic gradient palettes including spectrum, reverse spectrum, Parula, four-zone and single-hue ramps
- Shaded plots with full angular control of light source illumination
- Contour plots can be added automatically to the top and bottom of the surface
- Full animation of fitted surfaces in XY and Z angle sequences
- Confidence/prediction intervals (90, 95, 99, 99.9 and 99.99 percent)
- 3D residuals graphs

CODE GENERATION

- Twelve target languages, the same set as TableCurve 2D new
- C (64-bit), C (80-bit), C++, Fortran 77, Fortran 90, Java, MATLAB, Pascal, Visual Basic (VBA)
- Python, R, Maple new
- Function code or function code with full test routines
- Available for all built-in equations, including every subset surface

OUTPUT AND EXPORT

- Publication-quality printed graphs with full print preview
- Image formats include bitmaps, metafiles, enhanced metafiles and device-independent bitmaps
- File formats include ASCII, Excel .xlsx, Excel .xls and SigmaPlot new
- Professional reports with MS Word or RTF export that includes graphs and numeric results; available for all major procedures
- Full-resolution 3D vector graphics paste into Word, Excel or PowerPoint

INTEGRATED AUTOMATION

- Batch processing for automatically processing large numbers of data sets unattended; available for all major procedures
- Multiple data sets in an Excel spreadsheet processed with the ease of a single data set
- Stream reports directly to MS Word or RTF format
- Documented DLL with a flat, caller-allocated API new
- Loads directly from Python via ctypes new

SYSTEM REQUIREMENTS

- Windows 10 or Windows 11, 64-bit new
- x64 processor new
- 4 GB RAM minimum; 8 GB or more recommended for large subset searches and automation
- 250 MB of available disk space
- 1920 × 1080 display or higher recommended
- Internet connection required for licence activation and AI guidance