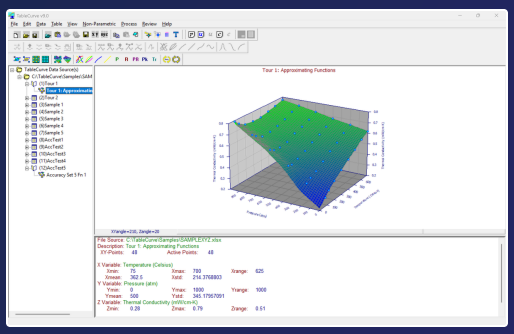
R²N SOFTWARE · TABLECURVE 9

TableCurve Studio

version 9.0



Curve fitting and surface fitting in one workspace

Stop guessing which model fits your data.

TableCurve Studio is the complete release: both fitting engines, both equation libraries and both graphics systems under a single licence. Curve fitting from a catalogue of 4,274 equations and surface fitting across 453 million candidates, in one project tree, plus a Python-callable fitting DLL.

TableCurve Studio v9.0

The complete ninth-generation release: TableCurve 2D and TableCurve 3D in a single 64-bit program, sharing one project tree, one report and one activation key.

One program, two dimensions

Most experiments begin as a response against one factor. Then somebody asks what happens when temperature also varies, and the dataset is a surface. With a single-edition licence that is a purchasing conversation. With TableCurve Studio it is a different node in the same project.

Studio is not a bundle of two programs. It is the one TableCurve 9 executable with both edition sets enabled, so XY and XYZ data sit side by side in the same tree, fits of both kinds appear in the same ranked review windows, and a mixed analysis exports as a single Word or Excel document. The curve engine and the

surface engine share an expression parser, a graphics engine, a code generator and a statistical reporting layer — you learn one program, not two.

What Studio gives you that the single editions do not

- **Curves and surfaces in one project.** XY and XYZ data sets open together, each with its own fits, graphs and generated code beneath it in the tree.
- **Nothing trimmed from the menus.** Single editions hide what they cannot run. Studio shows the whole program — every toolbar, every function library, every dialog.
- **User functions in both dimensions.** Define your own curves and your own surfaces, fitted by the same engine and ranked alongside the built-in libraries.
- **The full Ask menu.** Hand any fit — curve or surface — to Claude with its statistics and residual pattern attached.
- **One licence key to administer.** A single activation covers both engines. For a shared machine or a teaching lab that is one thing to track instead of two.
- **One report for the whole study.** Curves and surfaces export into the same document, so a mixed analysis does not become two deliverables.

3,893
curve equations fitted and ranked in a standard 2D run; 4,235 with multi-component models

37,365
surface equations fitted in a full 3D run, from 453 million candidates

1 licence
for both engines, both libraries and the complete menu set

THE TWO ENGINES

Automated discovery, in one dimension or two

TableCurve 2D — curve fitting

Give the program a column of x and a column of y. The curve engine fits **4,274 built-in equations** — 3,491 linear models and 783 nonlinear models — and sorts them by goodness of fit. A standard run fits 3,893 single-component equations; enable multiple components and it extends to 4,235, adding the two- and three-component peak and transition models wherever the signal-to-noise ratio supports resolving them.

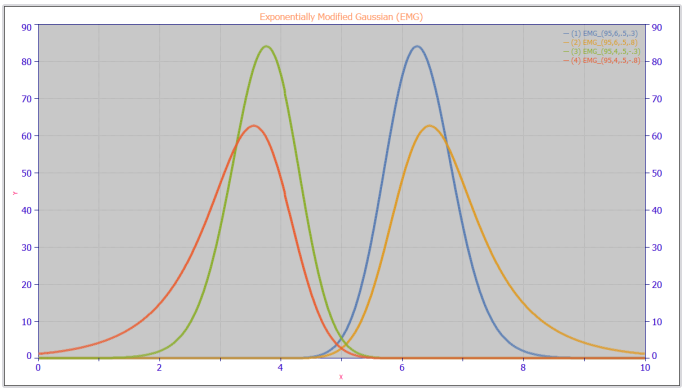
Peak, transition and kinetic families are first-class members of the library rather than something you hand-enter. Autoregressive procedures extrapolate forward, backward or both. Eight spline procedures

TableCurve 3D — surface fitting

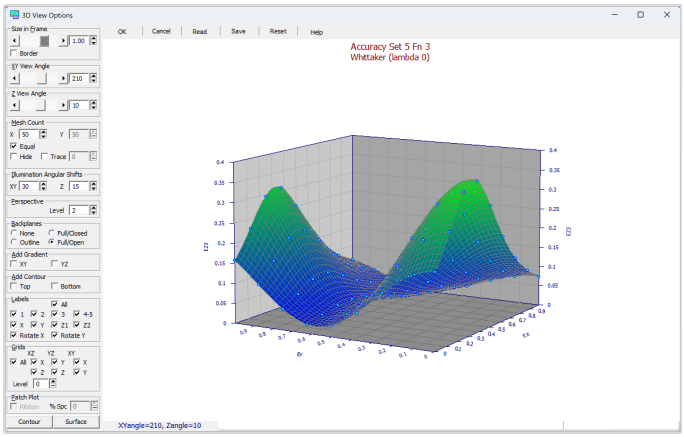
Give the program three columns. The surface engine fits **37,365 equations** in a full run — 36,582 best-subset surfaces chosen from a space of 453,687,714 candidates, plus 311 polynomials, 300 rationals and 172 nonlinear models — and ranks them the same way the curve engine ranks curves.

Scattered measurements are gridded first, by any of nine algorithms. Fitted surfaces rotate live, animate through an angle sequence, and carry contour plots on the top and bottom planes. Release 9 renders them with the full Matplotlib colormap family.

and five non-parametric estimators cover the data that no parametric model fits.



Exponentially modified Gaussians at four parameter sets — one of the chromatographic peak families built into the 2D library.



A fitted two-mode response surface with the measured points on the mesh, viewed at an XY angle of 210° and a Z angle of 10°.

RELEASE 9

What's new in TableCurve Studio 9.0

A 64-bit engine

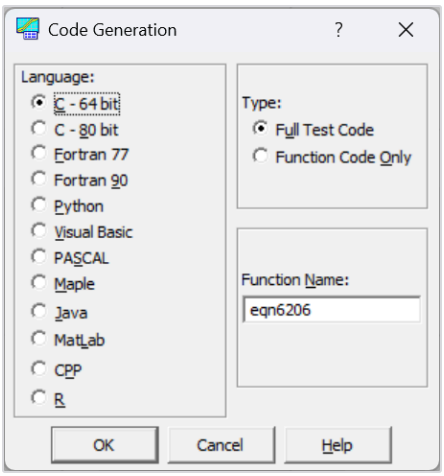
The entire program has been rebuilt as a native 64-bit application for Windows 10 and 11. Both fitting engines, the solver and the code generator are compiled for x64, graphs render against the modern Windows display stack, and the program runs without compatibility shims on current hardware.

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. It serves both engines: high-order polynomials and rationals, in one dimension or two, that degenerate into noise at ordinary double precision resolve cleanly instead of failing quietly.

AI guidance built in

Ask the program about the fit in front of you. Studio packages the selected equation, its coefficients, its full statistical summary and its residual pattern and hands them to Claude, so the answer concerns your data and your model rather than fitting in the



Code generation in the same twelve languages for curves and surfaces, with Python, R and Maple new in release 9. Export function code alone or with a full test routine.

More code-generation languages

Release 9 adds **Python**, **R** and **Maple** across both engines, plus **Java**, **MATLAB** and **C++** on the 2D side, so curves and surfaces now share the same twelve languages. Every built-in equation can be exported, including every subset surface.

abstract. Studio carries the complete Ask menu; the single editions carry a reduced form.

Matplotlib colormaps

The complete Matplotlib colormap family joins the gradient renderer — Viridis, Plasma, Cividis, Magma, Turbo, Coolwarm, Twilight and the rest. The perceptually uniform maps matter for surface work: they do not invent ridges where the data has none, and they stay readable in greyscale print and to colour-blind readers.

Two- and three-component models

381 multi-component peak and transition models join the 2D catalogue — Gaussian, Lorentzian, log-normal, extreme value, logistic, Erfc, pulse, LDR, Laplace, EMG, GMG, Voigt, LogNorm4, Gamma and Student families among them. 342 are fitted automatically.

Grouped toolbars and a project tree that remembers

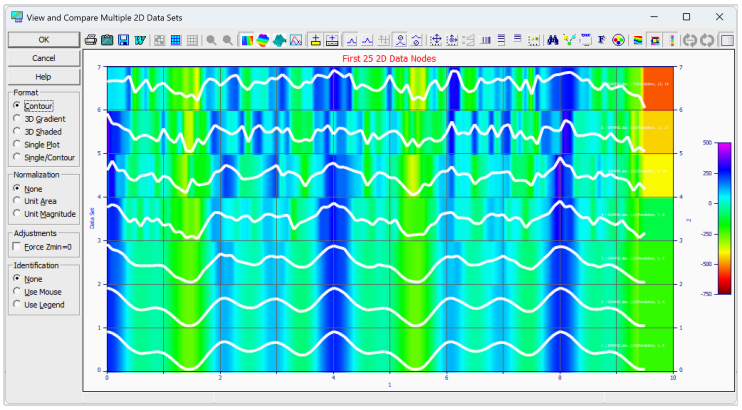
The toolbars are organised by task with a caption under each group — and Studio shows all three bars, standard, 2D process and 3D process. Up to 25 data sets stay open in a tree-structured explorer whose state is saved across sessions.

REVIEW, COMPARE, OUTPUT

All the tools you need to discover your ideal model

Ranked review, for both kinds of fit

Curves and surfaces are sorted and plotted by the statistical criterion you select — r^2, DOF adjusted r^2, fit standard error, maximum error or the F statistic. Scroll the list and the graph follows. Graph residuals in five formats, add confidence and prediction intervals to detect outliers, plot derivatives or cumulative area on a second Y-axis, and compare against equations saved to disk from prior fits.



View and compare multiple data sets as stacked traces, a contour field, 3D gradient or shaded plots, with optional unit-area or unit-magnitude normalisation.

Compare models using meaningful numeric information

Data, statistical and precision summaries display simultaneously and update automatically when a different equation is selected for review. The evaluation option with automated table generation includes function, derivatives, roots, cumulative area and — for surfaces — partial derivatives and cumulative volume.

Effectively manage complex data sets

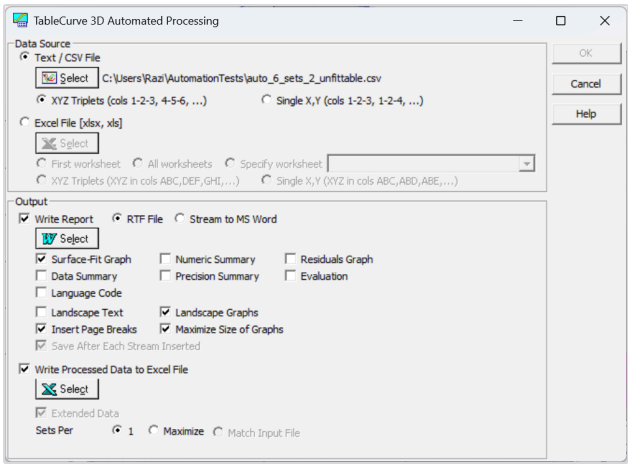
Six smoothing and denoising algorithms remove noise from XY data, including Eigendecomposition Denoising, a non-parametric procedure where separation is based on signal strength. Fourier denoising offers a data taper to minimize spectral leakage and filtering by FFT channel magnitude or frequency threshold. On the XYZ side, nine gridding algorithms turn scattered measurements into a uniform grid, with the input and output point counts reported as you work.

Flexible output options

Preview your graph and output publication-quality graphs in several formats. Produce files containing data and equations in Excel, ASCII and SigmaPlot formats. Full-resolution vector graphics paste into Word, Excel or PowerPoint. Professional reports with graphs and tables export to MS Word or generic RTF, half or full page, landscape or portrait, all in a single document.

Maximize your productivity with automation

Batch processing handles large numbers of data sets unattended, with no programming required, for all major procedures in both engines. Place the data sets in an Excel file and process hundreds of them in one click against a given equation or non-parametric procedure. Graphs and reports stream to Word or RTF; numeric information is written to a new Excel file.



Denoise a hundred data sets in one unattended step, fit them to a target equation in a second, and get a detailed report automatically.

NEW IN RELEASE 9 · FOR INSTRUMENT MAKERS AND AUTOMATED PIPELINES

Put both TableCurve engines inside your own software

The curve and surface fitting engines ship 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 XY or XYZ data set, runs the full equation scan, and reads back the ranked results, fitted parameters and fit vectors, without the user interface ever opening.

Instrument manufacturers

Embed automated curve and surface fitting behind your own acquisition software, so every measurement comes with a fitted model.

Automated pipelines

Fit thousands of data sets from a script, a LIMS or a QC line, using the same engines and ranking as the desktop program.

Research code

Call TableCurve from Python alongside NumPy and pandas, and keep equation discovery inside a reproducible notebook or workflow.

CHOOSING AN EDITION

Studio against the single editions

All three editions are the same installed program. Your licence key decides which capability is switched on, which means moving up to Studio is a key change — not a reinstall, not a data migration. Existing projects open unchanged.

TableCurve 2D

XY curve fitting with the full 2D library. 3D functions can be opened and viewed but not fitted. 2D menus, toolbars and user functions.

TableCurve 3D

XYZ surface fitting with the full 3D library and gridding. 2D functions can be opened and viewed but not fitted. 3D menus, toolbars and user functions.

TableCurve Studio

Both engines, both libraries, both graphics systems, user functions in both dimensions, the complete menu set and the full Ask menu — on one key.

USED IN PUBLISHED RESEARCH

TableCurve in the literature

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

Ovarian volume throughout life: a validated normative model
Kelsey TW et al. *PLOS ONE* 8(9): e71465 (2013)
REPRODUCTIVE MEDICINE · 2D

Development modeling of Lucilia sericata (Diptera: Calliphoridae)
Roe A, Higley LG *PeerJ* 3: e803 (2015)
FORENSIC ENTOMOLOGY · 2D

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

More published applications: r2nsoftware.com/knowledgebase/tablecurve

GET STARTED

Try TableCurve Studio 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

SCAN FOR R²N HOME

SPECIFICATIONS

TableCurve Studio 9.0 Features

- New in TableCurve Studio 9.0

INTERFACE

- Native 64-bit application for Windows 10 and 11
- Complete menu set — no edition trimming
- All three toolbars: standard, 2D process and 3D process, with printed group captions
- Full in-app AI guidance menu new
- Tree-structured project explorer holding XY and XYZ data sets together, up to 25 open at once
- Project state saved across sessions; resume without re-importing
- Multitasking with background thread fitting for both engines
- Automatic window placement and predefined Review tiling; layouts saved to disk
- Fully customizable 2D graphs and 3D surface graphs

DATA INPUT

- Native .xlsx worksheet import new
- Up to 65,536 points in an XY data table; 16,384 in an XYZ 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, binary
- Graphical XY and XYZ column selection with import preview
- Weights or standard deviations optionally assigned
- Compare up to five data sets; automatically process replicate data sets

DATA MANAGEMENT

- Real-time smoothing with FFT, Loess, Savitzky-Golay, Gaussian Convolution, Eigendecomposition and Kaiser-Bessel time-domain smoothing
- Real-time Fourier domain editing with exact-N FFT; data tapering
- Eigendecomposition filtering to isolate components based on signal strength
- 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 new
- Graphical and numerical sectioning; graphically enable or disable data points
- First and second order analytic derivatives for all built-in equations
- Apply calculations to X, Y, Z and Weight values

CURVE FITTING — 2D

- 4,274 built-in equations new
- 3,491 linear: 105 one-term, 630 two-term, 1,330 three-term, 1,140 four-term mixed basis function models
- 137 polynomials in 13 families, including Chebyshev, high-precision, Fourier-series, even order and half order
- 149 rationals in 14 families, including Chebyshev, high-precision, Fourier-series and iteratively refined sets

- 783 nonlinear: 402 single-component, 381 two- and three-component new
- 342 of the multi-component models fitted automatically, gated on measured signal-to-noise new
- High-precision polynomials and rationals fitted to 38 significant digits
- Up to 21 fitted parameters per equation
- AI Expert for automatic selection of peak, transition or kinetic models
- Robust straight-line fit option; three robust fitting methods for all nonlinear equations and user functions
- Fit All Equations fits 3,893; All Equations plus Multiple Components fits 4,235 new

SURFACE FITTING — 3D

- 453,688,497 built-in equations in the catalogue new
- 37,365 equations fitted in an All Equations run new
- 453,687,714 selective subset linear surfaces, 36,582 selected within a given fit
- Subset space built from 2 to 8 terms drawn from 42 basis functions, across 3 z-transforms
- 311 polynomials: 243 basic, 9 Chebyshev bivariate, 27 Chebyshev-ln, 9 cosine series, 9 sigmoid series, 10 Fourier series, 4 Fourier bivariate
- 300 rationals: 256 basic, 4 Taylor, 10 Chebyshev, 30 Chebyshev-ln
- 172 nonlinear: 72 peaks, 72 transitions, 24 exponential and power, 4 robust plane
- Maximum polynomial and rational order 65
- Up to 80 fitted parameters per equation
- Term significance adjustable from 1 to 15
- Simple preset fits 2,592 equations for a fast first look

NUMERICAL ENGINE

- 128-bit extended-precision solver carrying 38 significant digits, portable C implementation, shared by both engines new
- Levenberg-Marquardt nonlinear optimization
- Robust estimations: least absolute deviation, Lorentzian minimization, Pearson VII limit minimization
- Singular value decomposition for constrained and ill-conditioned systems

PREDICTION METHODS

- State-of-the-art autoregressive procedures for forward and backward predictions and extrapolations
- 9 different procedures — 3 to predict ahead, 3 to predict earlier data, and 3 that predict in both directions
- In-situ noise removal using advanced SVD and Eigendecomposition methods
- AR filter code generation supported in all languages, plus export filter to disk new

USER-DEFINED FUNCTIONS (UDFS)

- User functions in both dimensions: 15 curve UDFs and 15 surface UDFs
- UDF editor with push button help for inserting functions
- UDFs automatically compiled for speed
- Up to 10 adjustable parameters per function
- Graphical UDF adjustment procedure for refining starting estimates
- UDFs can be saved individually or as libraries
- Expression parser with more than 200 mathematical, statistical and special functions
- Series convergence, conditional statements, differentiation, integration and parameter constraints

ESTIMATION AND INTERPOLATION

- Eight spline procedures, 3 interpolation and 5 smoothing, including NURBS and least-squares B-splines with fixed, optimized, or user-specified knots
- Six procedures for spline estimation of smoothed data; 1st and 2nd derivatives
- Local regression spline estimation; 1st and 2nd derivatives
- Savitzky-Golay spline estimation; accurate derivatives orders 1-8; filter coefficients
- Fourier Interpolation; derivatives orders 1-4
- Nine 3D gridding and interpolation algorithms

ANALYSIS AND OUTPUT

Numerical

- Evaluation option with automated table generation: function, derivatives, partial derivatives, roots, cumulative area and cumulative volume; save evaluations to disk; automatically updated whenever an equation or algorithm setting changes
- Full numeric and statistical summary, including coefficients, standard error, confidence limits, ANOVA, goodness of fit, measured function and derivative, minima and maxima, maximum error, and poles reported for rational functions
- Data summary with predicted values, residuals and confidence/prediction limits
- Precision summary and term significance analysis across 17 precision levels
- Sort equations by r^2, DOF Adjusted r^2, Std Error, F-statistic, floating point speed, equation number and maximum error; arrange by parameter count

ANALYSIS AND OUTPUT

Graphical

- Full Matplotlib colormap family — Viridis, Plasma, Cividis, Magma, Turbo, Jet, Spectral, Coolwarm, Twilight, Cubehelix and more new
- Photorealistic rendering with full spectrum; shaded plots with angular control of light source illumination
- Curve-fit and surface-fit graphs with customizable layout, backplanes, labels, grids, scaling, points, font, titles and resolution; all customizations rendered in real time
- Confidence/prediction intervals (90, 95, 99, 99.9 and 99.99 percent)
- Residuals graphs, separate or on the Y2 axis, including bar graphs, histogram and stabilized normal probability plot; 3D residuals graphs for surfaces
- Contour plots added automatically to the top and bottom of a surface
- Full animation of fitted surfaces in XY and Z angle sequences
- View and compare multiple data sets as stacked traces, contour fields, 3D gradient or shaded plots new
- Exclude and Refit enables disabling of outliers and immediate refitting during equation inspection

CODE GENERATION

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

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 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 in both engines
- 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 — load data, run a scan, read back ranked results, parameters and fit vectors new

LICENSING

- One activation key enables both engines
- Annual subscription or perpetual licence
- Academic and commercial pricing on every edition and both terms
- Upgrade from TableCurve 2D or TableCurve 3D by changing the licence key — no reinstall, no data migration

SYSTEM REQUIREMENTS

- Windows 10 or Windows 11, 64-bit new
- x64 processor new
- 4 GB RAM minimum; 8 GB or more recommended for large data sets, 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