ORIGIN® 2016
Graphing & Analysis

Comparison of Origin and OriginPro

OriginPro provides all of the features of Origin, plus additional analysis tools and capabilities. The following tables provide comparisons between Origin and OriginPro in such areas as curve fitting, peak analysis, statistics, signal analysis, and image handling.

CURVE FITTING		ORIGIN	ORIGINPRO
LINEAR AND POLYNOMIAL FITTING	Linear Regression	✓	✓
	Linear Fit with X Error		✓
	Confidence Ellipse for Linear Fit	✓	✓
	Polynomial Regression	✓	✓
	Multiple Linear Regression	✓	✓
	Partial Leverage Plots in Multiple Regression	✓	✓
	Residual Analysis	✓	✓
NONLINEAR FITTING	Fitting Multiple Datasets	✓	✓
	Built-in Fitting Function and User-defined Fitting Function	✓	✓
	Parameter Initialization and Derived Parameter Definition	✓	✓
	Bounds and Constraints	✓	✓
	Weighted Fitting	✓	✓
	Fitting with Y Error	✓	✓
	Fitting with X and Y Errors (Orthogonal Regression)		✓
	Global Fit with Parameter Sharing	✓	✓
	Fitting Replica Data	✓	✓
	Residual Analysis	✓	✓
	Fitting with Implicit Functions (Orthogonal Distance Regression)		✓
	Fitting Comparison		✓
	Fit and Rank Multiple Models		✓
	Surface Fitting		✓

MATHEMATICS		ORIGIN	ORIGINPRO
SIMPLE MATHEMATICS OPERATIONS	Simple Mathematics Operations on or Between Datasets	✓	✓
	Set Column or Matrix Values by Using Mathematics Operations	✓	✓
	Normalization	✓	✓
INTERPOLATION AND EXTRAPOLATION	1D Interpolation and Extrapolation	✓	✓
	Interpolation and Extrapolation of Y From X	✓	✓
	Trace Interpolation on XY Data	✓	✓
	Trace Interpolation on XYZ Data	✓	✓
	2D Interpolation and Extrapolation	✓	✓
	3D Interpolation	✓	✓
DIFFERENTIATION AND INTEGRATION	Numerical Differentiation	✓	✓
	1D Numerical Integration	✓	✓
	2D Volume Integration		✓
AREA CALCULATION	Polygon Area	✓	✓
	XYZ Surface Area		✓
	Matrix Surface Area		✓
OTHERS	Average Multiple Curves	✓	✓
	Inverse of a Matrix	✓	✓

STATISTICS		ORIGIN	ORIGINPRO
DESCRIPTIVE STATISTICS	Basic Descriptive Statistics	✓	✓
	1D and 2D Frequency Counts	✓	✓
	Correlation Coefficient		✓
	Partial Correlation Coefficient		✓
	Cross Tabulation		✓
	Discrete Frequency	✓	✓
	Distribution Fit		✓
	Normality Test (Shaprio-Wilk, Lilliefors, Kolmogorov-Smirnov, Anderson-Darling, D'Agostino-K Squared, Chen-Shapro)	✓	✓
	Statistics Charts: Histogram, Box Chart, Scatter Matrix, QC Chart, Probability Plot, Q-Q Plot, and Pareto Chart	✓	✓
	Grubbs Test and Q-test to Detect Outliers	✓	✓
HYPOTHESIS TESTING	One Sample and Two-Sample t-Test, Pair-Sample t-Test	✓	✓
	Two Sample and Paired-Sample T-Test on Rows		✓
	One Sample and Two Sample Hypothesis Tests for Variance		✓
	One and Two-Proportion Test		✓
ANALYSIS OF VARIANCE	One Way ANOVA, Two Way ANOVA	✓	✓
	Three Way ANOVA		✓
	ANOVA: Mean Comparison (Tukey, Bonferroni , Scheffe, Dunn-Sidak, Fisher LSD, Holm-Bonferroni, Holm-Sidak)	✓	✓
	One Way and Two Way Repeated Measure ANOVA		✓
NONPARAMETRIC TESTS	Sign Test		✓
	Wilcoxon Test for One Sample and Paired Sample		✓
	Two Sample Kolmogorov-Smirnov Test		✓
	Mann-Whitney Test		✓
	Kruskal-Wallis ANOVA		✓
	Mood's Median Test		✓
	Friedman ANOVA		✓
MULTIVARIATE ANALYSIS	Principal Component Analysis		✓
	Cluster Analysis		✓
	Discrimininant Analysis		✓
	Canonical Discriminant Analysis		✓
	Partial Least Squares		✓
SURVIVAL ANALYSIS	Kaplan-Meier Estimator		✓
	Test Equality of Survival Functions (Log-Rank, Breslow and Tarone-Ware)		✓
	Cox Proportional Hazard Model		✓
	Weibull Fit		✓
POWER AND SAMPLE SIZE	One, Two and Paired-Sample t-Test, One Way ANOVA, One and Two-Proportion Test, One and Two -Variance Test		✓
ROC CURVE	ROC Curve		✓

PEAK ANALYSIS		ORIGIN	ORIGINPRO
PEAK ANALYSIS	Baseline Detection	✓	✓
	Baseline Subtraction	✓	✓
	Peak Finding	✓	✓
	Peak Integration	✓	✓
	Peak Fitting		✓
	Fit Baseline with Peaks		✓
	Fit Individual Peaks with Different Fitting Functions		✓
	Batch Peak Analysis		✓
SIGNAL ANALYSIS		**ORIGIN**	**ORIGINPRO**
SMOOTHING AND FILTERING	Smoothing using Savitzky-Golay Filter, Adjacent Averaging, FFT Filter, and Percentile Filter	✓	✓
	FFT Filters: Low Pass, Low Pass Parabolic, High Pass, Band Pass, Band Block, and Threshold	✓	✓
	IIR Filter Design		✓
FAST FOURIER TRANSFORM (FFT)	FFT with Basic Options	✓	✓
	2D FFT and 2D FFT Basic Filtering		✓
	Short-Time Fourier Transform (STFT)		✓
WAVELET ANALYSIS	Discrete Wavelet Transform (DWT) and Inverse Discrete Wavelet Transform (IDWT)		✓
	Wavelet Smoothing		✓
	Wavelet Denoising		✓
	Continuous Wavelet Transform (CWT)		✓
	Evaluation of Continuous Wavelet Function		✓
OTHERS	Convolution and Deconvolution	✓	✓
	Coherence		✓
	1D Correlation	✓	✓
	2D Correlation		✓
	Hilbert Transform		✓
	Signal Envelope		✓
	Signal Decimation		✓
	Rise and Fall Time Analysis		✓

DATA MANIPULATION		ORIGIN	ORIGINPRO
REORGANIZATION	Sort Worksheet or Columns	✓	✓
	Stack and Unstack Columns	✓	✓
	Pivot Table	✓	✓
	Split Worksheet	✓	✓
	Append Worksheet	✓	✓
TRANSFORMATION	Converting XYZ Data to a Matrix	✓	✓
	Transpose Worksheet or Matrix	✓	✓
	Shrink or Expand a Matrix	✓	✓
EXTRACTION AND REDUCTION	Worksheet Query	✓	✓
	Reduce Duplicate X Data	✓	✓
	Reduce Data by Skipping Every N Points	✓	✓
	Reduce Data to Evenly Spaced X	✓	✓
	Reduce XY Data by Group	✓	✓
OTHERS	Find and Replace Numeric and Text Values	✓	✓
	Translate Curve Vertically or Horizontally	✓	✓
	Data Filter for Worksheets	✓	✓
	Select or Hide Columns in Worksheet by Column Label	✓	✓

GADGET		ORIGIN	ORIGINPRO
Gadgets	Surface Integration Gadget		✓
	Global Vertical Cursor Gadget Across Graphs	✓	✓
	Intersect Gadget	✓	✓
	Quick Sigmoidal Fit Gadgete	✓	✓
	Cluster Gadget		✓
	Quick Peaks Gadget	✓	✓
	Differentiate and Interpolate Gadget	✓	✓
	Quick Fit Gadget	✓	✓
	Rise Time Gadget		✓
	Integrate, FFT and Statistics Gadget	✓	✓

IMAGE HANDLING		ORIGIN	ORIGINPRO
Image Adjustments	Brightness	✓	✓
	Contrast	✓	✓
	Gamma	✓	✓
	Hue	✓	✓
	Invert	✓	✓
	Saturation	✓	✓
	Histogram Contrast	✓	✓
	Histogram Equalization	✓	✓
	Auto Leveling	✓	✓
	Color Level	✓	✓
	Function Look Up Table		✓
	Leveling		✓
	Balance	✓	✓
	Color Replace	✓	✓
Arithmetic Transforms	Alpha Blend		✓
	Extract to XYZ		✓
	Image Simple Math		✓
	Math Function		✓
	Morphological Filter		✓
	Pixel Logic		✓
	Replace Background		✓
	Subtract Background		✓
	Subtract Interpolated Background		✓
Image Conversion	Convert Image to Data	✓	✓
	Convert Color Image to Grayscale	✓	✓
	Convert Data to Image	✓	✓
	Binary and Auto Binary	✓	✓
	Dynamic Binary		✓
	Threshold		✓
	RGB Merge / RGB Split		✓
	Image Scale		✓
Geometric Transforms	Auto Trim Image	✓	✓
	Crop Image	✓	✓
	Flip Image Horizontally or Vertically	✓	✓
	Offset Image	✓	✓
	Resize Image	✓	✓
	Image Rotation	✓	✓
	Shear Image	✓	✓
Spatial Filters	Average Filter, Gaussian Filter, and Median Filter	✓	✓
	Add Random Noise to Image	✓	✓
	Edge Detection	✓	✓
	Increase or Decrease Image Sharpness	✓	✓
	Apply Unsharp Mask	✓	✓
	User-Defined Spatial Filter		✓