

## Software Review of Prism 5

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**Prism 5.** GraphPad Software, Inc., 11452 El Camino Real, #215, San Diego, CA 92130. www.graphpad.com. See Web site for pricing information.

Prism 5 combines nonlinear regression, sophisticated statistics, and scientific graphing in a single integrated package for application to comprehensive data analysis and is available for both Macintosh and Windows platforms. Prism 5 runs on Intel- and PowerPC-based Mac computers using OS X 10.4 (Tiger) or 10.5 (Leopard). Prism for Windows requires Windows 2000, XP, or Vista. Some features with Prism for Windows require Internet Explorer 6 and Flash Player 7 or higher. A 2.4 GHz Intel-based Mac with 1 GB RAM running Mac OS X 10.5.2 was used for this evaluation, although the Windows version appears virtually identical.

I previously reviewed Versions 3 and 4 of Prism (*J. Am. Chem. Soc.*, **2002**, *124*, 9956–9957; *J. Am. Chem. Soc.*, **2003**, *125*, 10482), so I will just highlight here the significant changes in Version 5. Like the previous versions, Prism 5 is simple to install and use. Starting a new project is even easier now because Prism 5 provides sample data sets for every type of analysis and step-by-step instructions on floating notes. You can simply replace the sample data with your data, without having to figure out how to set up a new data table. Data can be easily imported or pasted from .txt or .csv or similar file formats.

Prism 5 has added several useful features that were missing in Version 4, e.g., the easy-to-manage function to give all the graphs in a project a consistent format (Prism Magic) and new tools for project annotation and navigation. The number of automatic graph types is extensive and includes all of the most common and useful scientific graphs: XY, semilog, histogram, four-quadrant, quality control, before and after plot, survival curve, mass spectrum, column and bar graphs, area fill plots, and meta-analysis plots. New formatting choices are available for all of the graph types. Version 5 is still unable to generate other types of charts, such as polar, pie, or 3-D charts that are found in competing graphing packages. However, Prism 5 offers extensive options for customizing graphs and designing layouts for printing or exporting. Graphs and tables generated by Prism 5 can be exported very simply into other programs, such as Microsoft Word or PowerPoint, or in XML, PDF, EPS, JPEG, PICT, BMP, PNG, and TIFF formats at various resolutions. The Windows version supports Object Linking and Embedding (OLE). In addition to the old PZF format, Prism 5 files can be saved in a new XML-based format, PZFX, which stores the data and info tables in plain text with XML formatting. The

PZFX format cannot be opened by older versions, but you can choose which is the default format.

The real strength of Prism remains its built-in statistical analyses. New analyses in Version 5 include correlation, frequency distribution, creation of second derivative of a curve (smoothing), column and row statistics, and comparison of survival curves. Nonlinear regression (curve-fitting) and other statistical analyses are readily performed using a much-expanded library with a built-in set of equations. User-defined equations remain simple to enter. Curve fitting has been enhanced by the introduction of a method to identify outliers and a very straightforward method for comparing models, e.g., which of two equations best fits the data set. Prism 5 retains the powerful data simulation function to generate theoretical curves that was introduced in Version 4.

Prism 5 still does not include calculation of multiple regression and thus cannot fit models with two or more independent variables, nor can it handle differential equations. However, the global curve-fitting function introduced in Version 4 essentially allows the use of a second independent variable and is particularly useful in enzyme kinetics and ligand binding applications.

Prism 5 retains its focus on the biological sciences, e.g., enzyme kinetics, binding studies, etc., but will handle most curve-fitting or statistical analyses in any area of chemistry and remains very simple to learn and use. The built-in help file/user manual includes step-by-step instructions for every type of graph and statistical analysis, as well as explanations of the theory and limitations of the various statistical and curve-fitting analyses and how to interpret the results generated by them. The GraphPad Web site has a tutorial and examples of nearly all of the analyses that Prism can handle. While working with the program, clear explanations and interpretations of the various statistical analyses are just a click away. Together, these resources provide a nice introduction to the practical uses and limitations of statistical analysis of two-dimensional data. Prism 5 is a substantial upgrade and remains the most user-friendly, yet powerful, package for scientific graphing and statistical analysis that I have seen.

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