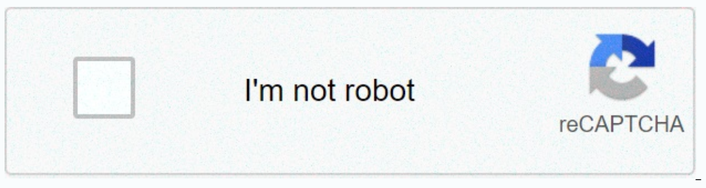

Continue

Plot graph in latex

This page contains a brief tutorial on how to create scientific graphs (feature excavator, histograms, bar graphs, distributed erven, contour lines, color charts, surface erven, ...) in LaTeX documents using GLE. Suppose we want to insert a chart of the sine function into a LaTeX document. That is, we'd like the following result: Because the support for creating graphs in LaTeX itself is limited, it's best to rely on an external chart program. That is, you create the chart of the sentences function with the chart program and save the result to a file. Then you include that file as a figure in your LaTeX document. The best file formats for storing graphs are the vector graphics file formats EPS and PDF because they are well supported by LaTeX and because they can be scaled without loss of quality to any resolution. Any chart program that supports these file formats can be used to create graphs that can be included in a LaTeX document. Examples of such apps are GNUPlot, Asymptote, GRI, R, Octave and Excel. Further down this page, I'll show how the free software chart tool GLE can be used to this end. For now, I assume you've already created your chart in EPS or PDF format and saved it in the same folder as where your LaTeX file is (your .tex file). If you want to follow this example, you can download such a file for the sentence function here: sin.eps, sin.pdf. You can include a figure in EPS or PDF format in a LaTeX document using the graphics package. The following is an example of a LaTeX file that sins the figure of the file.eps (or probe.pdf): \documentclass{article} \usepackage{graphics} \begin{document} \begin{figure} \includegraphics{sentence} \caption\label{sin}The sentences function.} \end{figures} \end{document} The main parts here are the \usepackage{graphics}, that must go at the top of your LaTeX document (in the so-called attachment) and the \includegraphics{sin}, which enters the graph of the file probe into your LaTeX document. Note that extending the .eps or .pdf file name is not required. If you process your document with latex in DVI format, it will use .eps new version; if you process your document with pdflatex to produce a PDF document, it will use .pdf new version. Below I will assume you are using pdflatex. Assume you saved the above LaTeX document to a file called graph.tex (available here) and that you have sin.eps files and downloaded probe.pdf to the same directory. Now you can .tex pdflatex chart to produce the final result: chart.pdf. Plow features and data in LaTeX are quietly easy and this is possible thanks to the TikZ and Pgfplots packages. In this tutorial, we learn how to create functions from a mathematical expression or from a given data Plot. Furthermore, we will learn how to create axes, add labels and legend and the chart style. Let's consider the following function: y = \exp\left(-\cfrac{x}{10}\right)\left(\cos{(x)}+\cfrac{1}{10}\sentence{(x)}\right) where we want to get something similar to the following figure along with a data plotted from a given file. Plotting function and data in LaTeX using Pgfplots packageLet's start by setting up the tikzpicture environment. First of all, we need to set up the project by loading the Pgfplots package into the applift. It should be dived on that when you write \usepackage{pgfplots} a code in the pgfplots loads the TikZ package. \documentclass{standalone} \usepackage{pgfplots} \pgfplotsset{compat = latest} \begin{document} \begin{tikzpicture} \begin{if}[] % here comes the code \end{if} \end{tikzpicture} \end{document} Set up the above code delivers to the following illustration: It is important to use the command \pgfplotsset{compat = latest} to specify to the compiler that we are working with the last version of the Pgfplots package. To start plot functions and data in TikZ, we need to create the as environment within the tikzpicture environment. All the pg plots commands must be within the aeration environment. To plot a function, we just need to use the command \addplot[options]{ewpression}. Check the following code to find out how this command should be used for the above function.\document class{standalone} \usepackage{pgfplots} \pgfplotsset{compat = latest} \start{document} \start {tikzpicture} \begin{if}[] \addplot[] {exp(-x/10)*(cos(deg(x)) + probe(deg(x))/10)}; \end{axis} \end{tikzpicture} \end{document} Setting the above code returns: Plotting a function with default parametersThe domain and scope of the plot was automatically determined by the compiler. So if we want to change the boundaries of the plot, we must manually specify it in the as environment. For this purpose, we can use these options: xmin=<value>: Lower limit in the x-axle for the plot.xmax= : Upper limit in the<value>x axle for the plot.ymin=<value>: Lower limit in the y axle for the plot.ymax=<value>: Upper limit in the y axle for the plot. For this example, let xmin = 0.0, xmax = 30, ymin=-1.5 and ymax=2.0 be. Of course, you can change these values depending on the domain and scope of the function. Here's a modified version of the above code:\documentclass{standalone} \usepackage{pgfplots} \pgfplotsset{compat = latest} \begin{document} \start{tikzpicture} \start{if}[xmin = 0, xmax = 30, ymin = -1.5, ymax = 2.0] \addplot[domain = 0:30,] {exp(-x/10)*(food(deg(x)) + probe(deg(x))/10)}; \end{if} \end{tikzpicture} \end{document} Plotting forgot a function with custom asseDon't to specify the domain of the function with the domain option = a:b. In this case, we set this parameter to domain = 0:30. The domain of the function is independent of limits of the axes, but usually it takes the same values to get a plot containing the</value> </value > </value >

</value > </value > previous figure has a rough plot and to get a smooth one, we can use the following options:<value>samples= : This parameter determines the number of point to be plotted for the function, while greater the number looks better the function.smoothly: If we use this option, the compiler makes an interpolation between the point plotted to get a soft look for the feature. The acquired illustration is shown below (smooth plot). We changed the stroke and color of the function by providing the options thick and blue to the \addplot command. You can try different strokes: ultra thin, very thin, thin, semithick, thick, very thick, ultra thick and line width=<value>. Line width options\documentclass{selfalone} \usepackage{pgfplots} \pgfplotsset{compat = latest} \begin{document} \start{tikzpicture} \begin{if}[xmin = 0, xmax = 30, ymin = -1.5, ymax = 2.0] \addplot[domain = 0:30, samples = 200, smooth, thick, blue,] {exp(-x/10)* (cos(deg(x)) + probe(deg(x))/10)}; \end{axis} \end{tikzpicture} \end{document} Set up this code render: Smooth plotThe next step is to set up the grid and the aspect ratio of the figure. This can be achieved by using these options: grid: When these options are set to both the small and large grid is plotted. function, while bigger the number better looks the function.xtick distance=<value>: Is the distance between major ticks in the x-axis.ytick distance=<value>: Is the distance between major ticks in the y-axis.minor tick num=<value>: Is the number of ticks between major ticks.minor grid style={options}: This option can be used for the minor as well as major grid and it changes the color and stroke of the grid.width=<value>: sets the width of the figureheight=<value>: sets the height of the figureHere is a piece of code that uses the above parameters: \documentclass{standalone} \usepackage{pgfplots} \pgfplotsset{compat = newest} \begin{document} \begin{tikzpicture} \begin{axis}[xmin = 0, xmax = 30, ymin = -1.5 , ymax = 2.0 xtick distance = 2.5, ytick distance = 0.5, grid = both, minor tick num = 1, major grid styles = {lightgray} , small grid style = {lightgray!25}, width = \textwidth, height = 0.5 \textwidth] \addplot[domain = 0:30, samples = 200, smooth, thick, blue,] {exp(-x/10)*(cos(deg(x)) + probe(deg(x))/10)}; \end{axis} \end{tikzpicture} \end{document} Change the figure size in Pgfplots to match text width of the document. Now suppose you don't have the expression of the function you want to plot, but instead you have a file, for example, kosine.dat with the coordinates as shown below. Here we use a space as separation of the coordinates, but also you can use a comma, just specify the separator using the col sep option = comma in the \addplot command. x 0.0 1.0000 0.5 0.8776 1.0 0.5403 1.5 0.0707 2.0 -0.4161 2.5 -0.8011 3.0 -0.9900 33.5 -0.9365 4.0 -0.6536 4.5 -0.2108 5.0 0.2837 5.5 0.7087 6.0 0.9602 6.5 0.9766 7.0</value> </value> </value> </value> </value> </value> </value> </value> 7.5 0.3466 ... % data file Plotting a data files is very similar to plot a mathematical expression, we use again the \addplot command but in slightly different way:\addplot[options] file[options] {file_name.dat}The next code shows the implementation of this sentence for plot the previous data file:\documentclass{standalone} \usepackage{pgfplots} \pgfplotsset{compat = newest} \begin{document} \begin{tikzpicture} \begin{axis}[xmin = 0, xmax = 30, ymin = -1.5, ymax = 2.0 xtick distance = 2.5, ytick distance = 0.5, grid = both, minor tick num = 1, major grid style = {lightgray}, minor grid style = {lightgray!25}, width = \textwidth, height = 0.5\textwidth, xlabel = {x}, ylabel = {y},] % Plot a function \addplot[domain = 0:30, samples = 200, smooth, thick, blue,] {exp(-x/10)*(cos(deg(x)) + sin(deg(x))/10)}; % Plot data from a file \addplot[smooth, thin, red, shattered] file[skip first] {cosine.dat}; \end{if} \end{tikzpicture} \end{document} Plot data from an external fileNow we have looted the file, which in this case represents the coin function, but you can plot any set of coordinates. In options, we added shattered style for the curve and we painted it with red color. Also note that we are hitting the option first used since the data file has labels instead of numbers in their first line. We're almost done, we just have to add a legend to the graphic. This can be done simply by adding the following line code:\legend{Plot of expression, Plot from file}to the last \addplot line code. In doing so, we will get the figure in question. Now suppose you want to plot a data file with multiple columns, for example, this file named multiple_functions.dat, which has multiple columns. x y1 y2 y3 0.0 0.0000 0.0000 0.0000 1.0 0.0100 0.0050 0.0025 2.0 0.0400 0.0200 0.0100 3 .0 0.0900 0.0450 0.0225 4.0 0.1600 0.0800 0.0400 5.0 0.2500 0.1250 0.0625 6.0 0.3600 0.1800 0.0900 7.0 0.4900 0.2450 0.1225 8.0 0.6400 0.3200 0.1600 9.0 0.8100 0.0.0.00 4050 0.2025 10.0 1.0000 0.5000 0.2500 % data file In this data file we can see four columns, the first one is the coordinates of the x-axle and the other three columns correspond to the y axle values for each x-value. This means we need to plot three functions of a single data file. This can be easily accomplished by using the command: \pgfplotstableread{file.dat}{\table}This command reads a file and stores it as a table where you can access the columns once a time. The following code shows implementing the \pgfplotstableread command to plot the data file: \documentclass{standalone} \usepackage{pgfplots} \pgfplotsset{compat = latest} \begin{document} \pgfplotstableread{multiple_functions.dat}{\table} \begin{tikzpicture}\begin{as}[xmin = 0, xmax = 10, ymin = 0, ymax = 1, xtick distance = 1, ytick distance = 0.25, grid = both, small tick =1, large grid style = {lightgray}, small grid style = = width = \textwidth, height = 0.75\textwidth, legend cell in line = {left}, legend post = North West] \addplot[blue, mark = *] table [x = {x}, y = {y1}] {\table}; \addplot[red, only points] table [x={x}, y = {y2}] {\table}; \addplot[teal, only points, mark = x, mark size = 3pt] table [x = {x}, y = {y3}] {\table}; \legend{ Plot with points and line, Plot only with points, Plot with other type points } \end{if} \end{tikzpicture} \end{document} Setting the code returns: Plot data from multicolumn file in LaTeX using Pgfplots packageTo plot a specific column of a data file, we can use \addplot along with the \table command, as follows: \addplot[options] table [x = {column_x , y = {column_y}] {\table}; With the table option, you can specify the name of the column you want to be in the x-axle and the name of the column you want to be in the y axle. To get different plot style, one with points and lines, and two only with points, we used the following options: brand=<option>: This adds a mark for each coordination plotted, and it can equal *, oh or x, depending on the style you want for the market.only points: This option allows you to plot only points without the connection lines.market size=<value>: Specify the size of the points. This can be useful when you need to plot multiple graphics on the same figure. With the method described in this tutorial, you can draw any explicit functional comparison or any set of coordinates. The Pgfplots package can plot a number of features in the same figure. Now it's up to you how to use these tools to create your own graphics. At this level, we have reached the end of this tutorial. If you have any remarks or suggestions, I'd be happy to hear from your . . </value >

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