

## Styling Maple graphics with TikZ and L<sup>A</sup>T<sub>E</sub>X

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### Abstract

Styling Maple graphs with TikZ and L<sup>A</sup>T<sub>E</sub>X is demonstrated. This lets graphs escape Maple's native formatting limits, and achieve visual harmony with L<sup>A</sup>T<sub>E</sub>X documents they're embedded in. Supporting code resources have been made freely available.

### 1 Maple graphs

Maple is mathematics software, known especially for computer algebra [2, 3, 12, 13, 14]. It's akin to MATLAB, Magma, Mathematica, etc., and their free alternatives like Maxima, Octave and SageMath [1, 4, 7, 10].

Maple can be used for graphing [8, 11, 12]. Indeed, *TUGboat* has previously noted Maple as suited to complex graphs, more so than, e.g., METAPOST [9].

This article demonstrates styling Maple graphs with TikZ and L<sup>A</sup>T<sub>E</sub>X. Such styling has a couple of benefits. Firstly, it gives Maple users extended graphing flexibility. Maple has a range of graph formatting and typesetting options, but TikZ and L<sup>A</sup>T<sub>E</sub>X provide more. Maple 2025.1 doesn't appear to allow graph tickmarks and their labels to be different colors, for example. Secondly, it can improve the typographical harmony between Maple graphs and L<sup>A</sup>T<sub>E</sub>X documents they appear in.

### 2 The standard normal cumulative distribution function

The standard normal cumulative distribution function was deemed to be mathematically non-trivial without being esoteric, at least to an audience interested in mathematical graphics. It was therefore chosen as an example function to demonstrate styling Maple with TikZ and L<sup>A</sup>T<sub>E</sub>X.

A continuous random variable  $Z$ , with a normal distribution of mean  $\mu$  and variance  $\sigma^2$ , may be denoted  $Z \sim \mathcal{N}(\mu, \sigma^2)$ . It is said to have a *standard* normal distribution when  $\mu = 0, \sigma^2 = 1$  [5, 6].

The associated standard normal cumulative distribution function [5, 15, 16] for  $Z \sim \mathcal{N}(0, 1)$  is

$$\Phi(z) \equiv \Pr(Z \leq z) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^z e^{-t^2/2} dt.$$

### 3 TikZ styling Maple

The top panel of Figure 1 shows  $\Phi(z)$  graphed in a Times New Roman typeface with Maple.

To restyle the graph, its default formatting was removed. That was done by setting the axes, font and

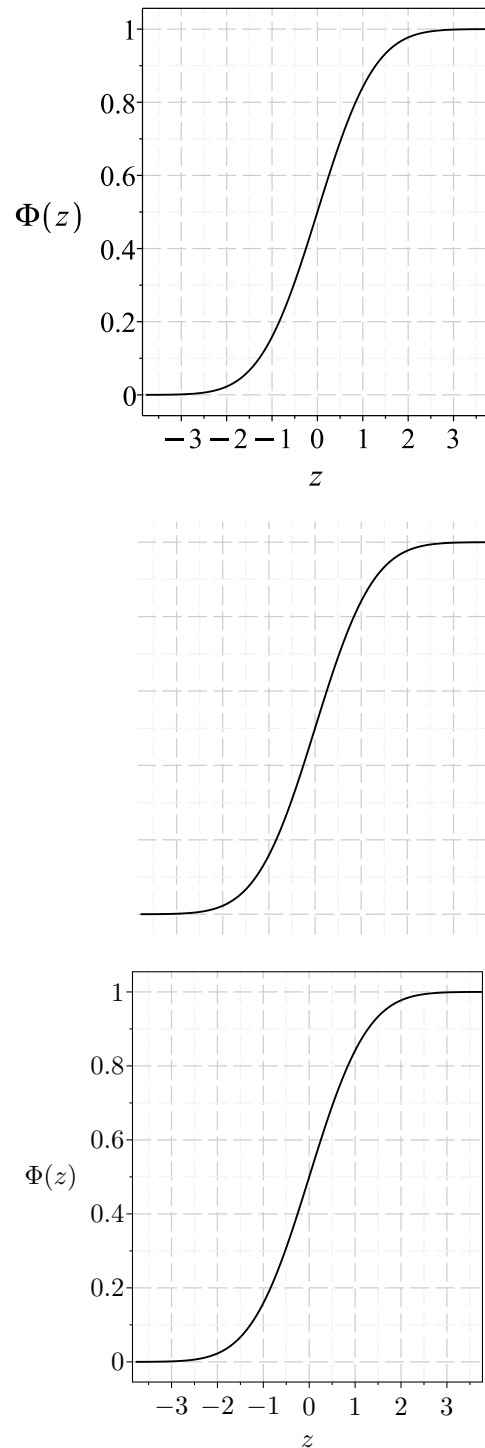


Figure 1: The standard normal cumulative distribution function  $\Phi(z)$ . Top: default Maple output. Middle: bare Maple output with white axes, font and tickmarks. Bottom: bare Maple output styled with TikZ and L<sup>A</sup>T<sub>E</sub>X, including a typeface change.

tickmarks to white in Maple, as shown in the middle panel of Figure 1. PDF cropping of the output graph was achieved by calling `pdfcrop` from Maple. The `pdfcrop` Perl utility is included in T<sub>E</sub>X distributions like MiK<sub>T</sub>E<sub>X</sub> and T<sub>E</sub>X Live.

Graph structural elements were then restored via `TikZ \draw` calls, with tickmarks and their labels arranged at regular intervals via `\foreach` calls. Axis labels were reapplied via L<sup>A</sup>T<sub>E</sub>X in `TikZ` nodes. The bottom panel of Figure 1 shows the resulting  $\Phi(z)$  function graphed in a Computer Modern typeface, consistent with the rest of this article.

#### 4 Conclusion

Modest restyling (typeface change) of a Maple graph was demonstrated here via `TikZ` and L<sup>A</sup>T<sub>E</sub>X. More extensive styling is of course possible (font colors, size, positioning, etc.), to the extent `TikZ` enables.

The Maple, `TikZ` and L<sup>A</sup>T<sub>E</sub>X code used to generate Figure 1 is available on GitHub at [github.com/tstenborg/TikZ-Styling-Maple](https://github.com/tstenborg/TikZ-Styling-Maple). The development platform was Maple 2025.1 on Windows 11 Home, version 24H2.

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