A damped oscillator, plotted from Fortran

foresight's path C

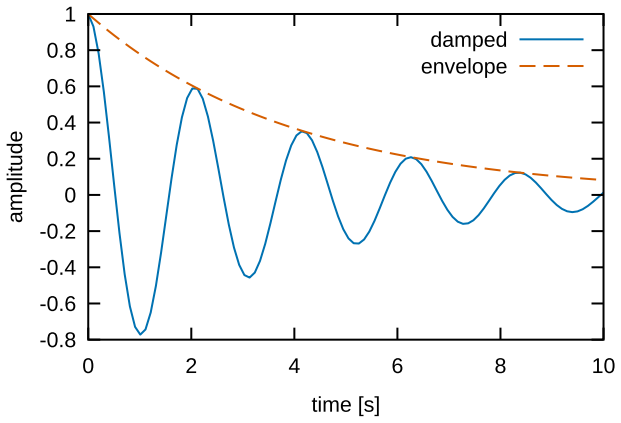

Figure 1: A column figure: `theme paper`, 8 pt texts, 0.75 pt lines.

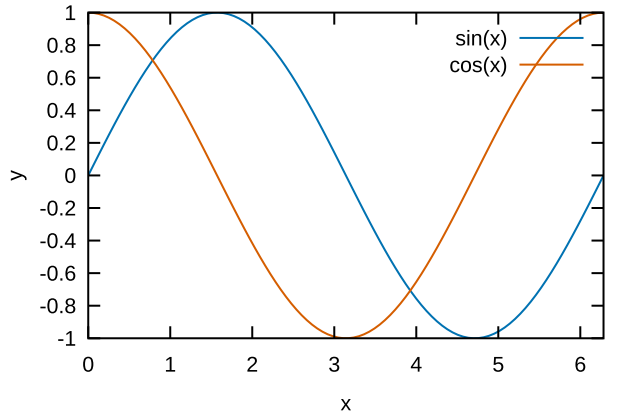

Figure 2: The column size, `size single`: 8.5 by 6 cm.

1 Introduction

The figures of this paper are PDF files written by foresight, a Fortran library and command line that reads gnuplot scripts. Each is included at its own size: a column is 8.5 cm wide, the page 17.8 cm, so neither the texts nor the lines of a figure are scaled by LaTeX. Their fonts are embedded in them, Liberation Sans and Latin Modern Roman.

2 The response

A damped oscillator answers a step with the oscillation of Figure 1, decaying within its envelope $e^{-t/\tau}$. Figure 2 is the same set of curves at gnuplot's defaults made into a column figure by `set terminal pdfcairo size single theme paper`.

3 Frequency response

The gain $|H(i\omega)| = 1/\sqrt{(1-\omega^2)^2 + (2\zeta\omega)^2}$ peaks near the natural frequency for small damping ratios ζ (Figures 3 and 4); the phase turns by half a period across it.

4 Labels set by LaTeX

A figure's labels can also be set by LaTeX itself, in the paper's fonts and with its math: foresight's `set terminal cairolatex` writes the drawing as a PDF and the labels as a LaTeX picture, as gnuplot's cairolatex does, which the paper includes by `\input`. In Figure 5 the axis labels t/τ and x/x_0 and the key are set in Latin Modern, as this text; in Figure 6 the damping ratio ζ of each curve.

5 Conclusion

A figure made for its column needs nothing but `\includegraphics`, or `\input` for one whose labels LaTeX sets: no scaling, no converter, its fonts travel with it.

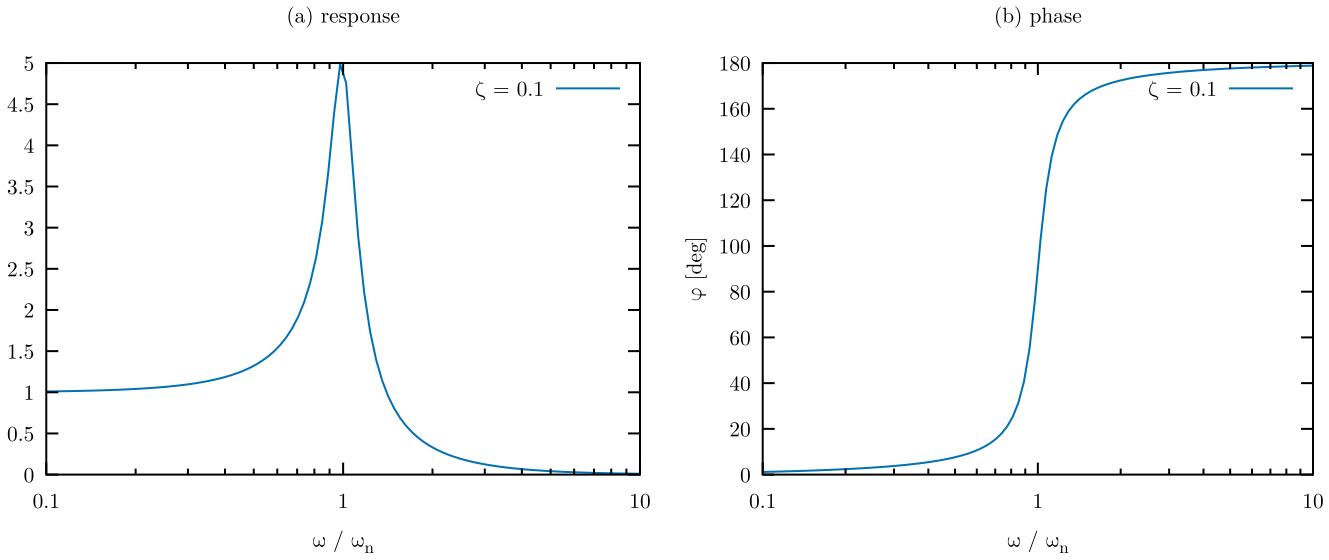

Figure 3: Two panels across the page, in Latin Modern Roman: `size double theme paper serif`.

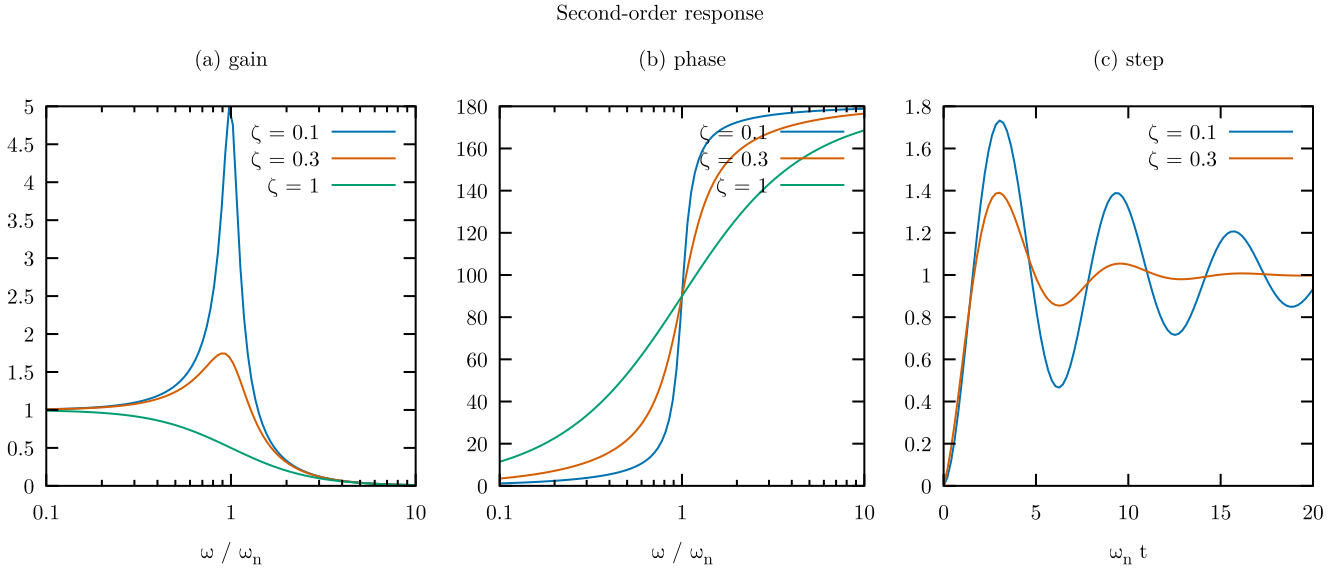

Figure 4: Three panels of a multiplot layout under its title.

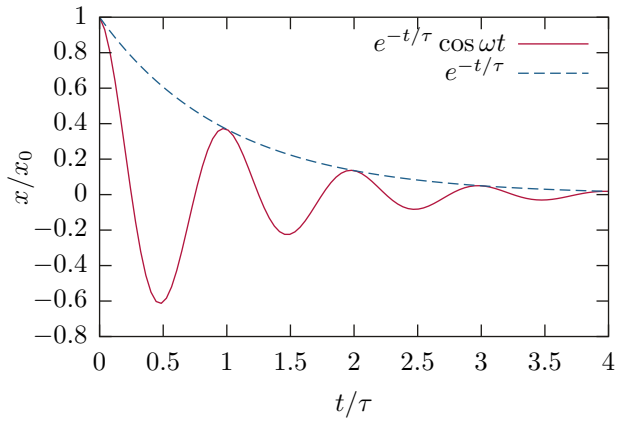

Figure 5: The response, its labels set by LaTeX: `set terminal cairolatex pdf size single`.

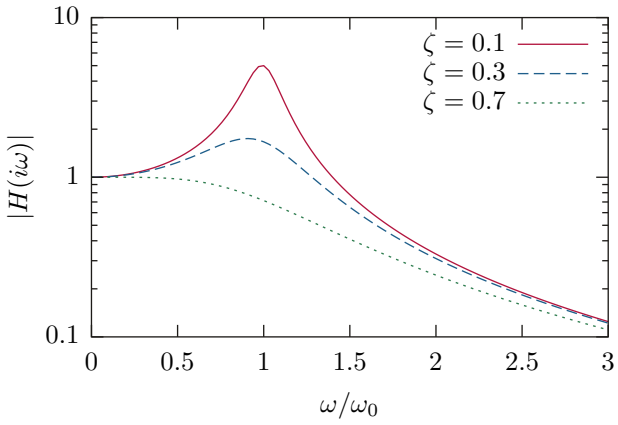

Figure 6: The gain $|H(i\omega)|$ for three damping ratios, on a logarithmic axis.