

The MetaPost System

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March 17, 1998

Abstract

The MetaPost system implements a picture-drawing language very much like Knuth's METAFONT except that it outputs PostScript commands instead of run-length-encoded bitmaps. MetaPost is a powerful language for producing figures for documents to be printed on PostScript printers. It provides easy access to all the features of PostScript and it includes facilities for integrating text and graphics.

This document describes the system and its implementation. It also includes basic user documentation to be used in conjunction with *The METAFONTbook*. Much of the source code was copied from the METAFONT sources by permission from the author.

1 Overview

The MetaPost system is based on Knuth's METAFONT¹ [?] and much of the source code is copied with permission from the METAFONT sources. MetaPost is a graphics language like METAFONT, but with new primitives for integrating text and graphics and for accessing special features of PostScript² such as clipping, shading, and dashed lines. The language has the main features of METAFONT including first-class objects for curves, pictures, affine transformations, and pen shapes. Another feature borrowed from METAFONT is the ability to solve linear equations that are given implicitly, thus allowing many programs to be written in a largely declarative style.

While MetaPost could be used as a tool for generating PostScript fonts, the intended application is to generate figures for \TeX ³ and *troff* documents. The figures can be integrated into a \TeX document via a freely available program called `dvips` as shown in Figure 1.⁴ A similar procedure works with *troff*: the `dpost` output processor includes PostScript figures when they are requested via *troff*'s `\X` command.

¹METAFONT is a trademark of Addison Wesley Publishing company.

²PostScript is a trademark of Adobe Systems Inc.

³ \TeX is a trademark of the American Mathematical Society.

⁴The C source for `dvips` comes with the web2c \TeX distribution. Similar programs are available from other sources.

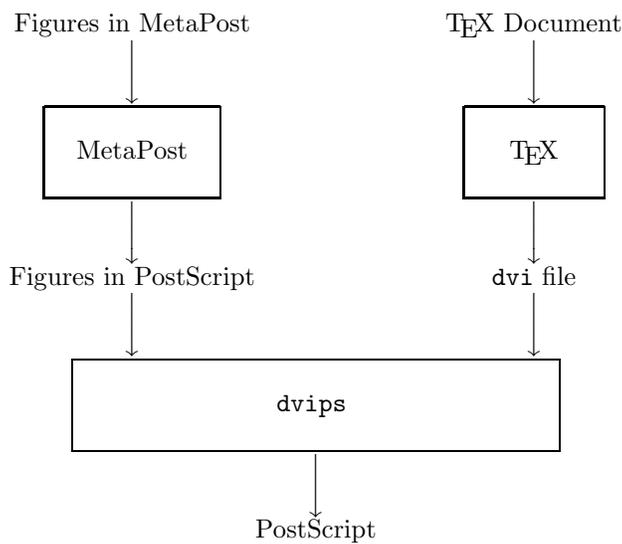


Fig. 1: A diagram of the processing for a \TeX document with figures done in MetaPost

Other than the new commands for integrating text and accessing features of PostScript, the main difference between the `METAPOST` and MetaPost languages is that the latter deals with continuous pictures rather than discrete ones. This affects the coordinate system and some of the subtler aspects of the language as outlined in the next two sections.

Sections ?? and ?? give a short summary of the language with numerous examples. Then Section ?? describes the implementation. A preliminary description of the language has already appeared [?].

2 Introduction to MetaPost

MetaPost is a lot like Knuth's `METAPOST` except that it outputs PostScript programs instead of bitmaps. Knuth describes the `METAPOST` language in *The METAPOSTbook*. [?]

This document introduces MetaPost via examples and references to key parts of *The METAPOSTbook*. It is a good idea to start by reading chapters 2 and 3 in *The METAPOSTbook*. The introductory material in these chapters applies to MetaPost except that coordinates are in units of PostScript points by default (72 units per inch).

To see MetaPost in action, consider a file `fig.mp` containing the following text: