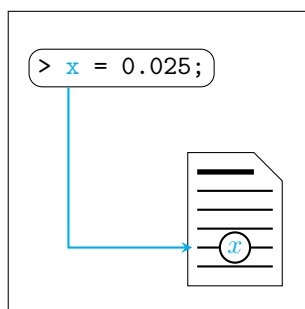


The **datax** package*

David Gustavsson david.e.gustavsson@gmail.com

February 9, 2022



1 Motivation

datax allows you to export data from your scripts, and import them as literal strings or `\siunitx` commands. If the scripts or the data on which they operate change, the printed data will update as well. This is analogous to how the author uses **graphicx** to programmatically generate graphics and include in a document.

An alternative is to simply print `\defs`, which scales poorly (but is similar to how this package works under the hood). Or using something like `csvread`, which seems overkill for individual data points, and can be quite difficult to index into.

datax is intended to work as an extension of your variable name space from scripts to your document: you should simply be able to call your variables by the same name in \LaTeX as in your scripts.

2 Installation

If you have a \LaTeX package manager, like `texlive` or `miktex`, use it to download the package from ctan. Otherwise, download the repository and place `datax.sty` in a place where \LaTeX can find it (often `~/texmf/tex/latex/datax/datax.sty`). Run `texhash` if needed.

*This document corresponds to **datax** v1.2.0, dated 2022-01-27.

Table 1: Outputs from the `\datax` command

| Input | Output |
|--------------------------------|----------------------------------|
| <code>\datax{s}</code> | A literal string |
| <code>\datax{x}</code> | 2.4 |
| <code>\datax{c}</code> | $3 \times 10^8 \text{ m s}^{-1}$ |
| <code>\datax{undefined}</code> | ?? |

Table 2: Implemented language plugins

| Language | Plugin | Comments |
|---------------------|---------------|-----------------------|
| <code>julia</code> | LaTeXDatax.jl | By the present author |
| <code>Matlab</code> | LaTeXDatax.m | By the present author |
| <code>Python</code> | LaTeXDatax.py | By the present author |

3 Usage

The package is loaded with `\usepackage[dataxfile=<data.tex>]{datax}`, which reads the file specified as *<dataxfile>*. From then on data can be inserted as `\datax{<tag>}`. If, for instance, the file `data.tex` contains references to a string *s*, a number *x* and a physical constant *c*, then the macro produces the output in table 1.

I highly recommend using `siunitx` (in general, but with `datax` in particular). It is of course possible to use the literal string function to circumvent `siunitx` and make `datax` print numbers without `\num` and `\SI`, which is why `siunitx` is not loaded as a prerequisite, but I have deliberately chosen to use these commands per default when printing numbers and quantities because it looks much better.

4 Interactions

Technically, `datax` only needs a data file consisting of a number of assignments: `\pgfkeyssetvalue{/datax/<tag>}{<value>}` but of course the entire point of the package is automation. For this, you need an interaction plugin for your script language. If your language is not listed in table 2, you might need to write this plugin for yourself, or request it.

Installation instructions and usage documentation is available at the respective repositories. In general these plugins are installed using the language’s default plugin manager.

Taking `julia` as an example, the variables in table 1 could have been generated with the script in listing 1.

Listing 1: Example julia script to generate the outputs in table 1

```
#!/julia
using LaTeXDatax, Unitful

s = "A_literal_string";
x = 2.4;
c = 3e8u"m/s";

@datax s x c
```

5 Implementation

Default data file name: `data.tex`

```
1 \pgfkeys{ /packageoptions/dataxfile/.initial=data.tex, }
```

Read any given options into family `/packageoptions/`. Then introduce family `/datax/` where all the variables will be stored.

```
2 \ProcessPgfPackageOptions{/packageoptions}
3
4 \pgfkeys{ /datax/.is family, datax,%
5     .unknown/.code={ \pgfkeyssetvalue{%
6         \pgfkeyscurrentpath/\pgfkeyscurrentname%
7     }{ #1 } },%
8 }
9
```

If data file exists, source it (storing all the variables in `/datax/`). Otherwise, throw a warning.

```
10 \def\dataxfile{./\pgfkeysvalueof{/packageoptions/dataxfile}}
11 \InputIfFileExists{%
12     \dataxfile
13 }{}{
14     \PackageWarning{datax}{Cannot read file ‘\dataxfile’}
15 }
```

`\datax` Include datum. If the supplied tag is unused, print bold question marks (like `\ref`), and throw a warning.

```
16 \newcommand{\datax}[2][]{%
17     \pgfkeysifdefined{/datax/#2}{%
18         {%
19             \ifpackageloaded{siunitx}{%
20                 \sisetup{#1}%
21             }{}%
22             \pgfkeysvalueof{/datax/#2}%
23         }%
24     }{%
```

```
25      \PackageWarning{datax}{Data value '#2' undefined}\textbf{??}%  
26      }%  
27 }
```