Documentation test document

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Contents

Table 2 Prefixes for reference labels

Type	prefix
Equation	eq:
Table	tab:
Figure	fig:
Algorithm	alg:
Listing	lst:

1 Introduction

This documents shows the usage of the general style definitions for documentation. Most command are defined using the math mode. Even some are directly usable in free text, they still switch to math mode. This changes the font and style. Keep that in mind. If the math mode must be enabled manually, this is shown in the examples.

1.1 References

Use the cref package for references. It will detect automatically the type of reference and add the according description:

Figure 1 Empty Figure with label `fig:label_1`

Table 1 Empty Table with label `tab:label_2`

$$1 + 1 = 2 \tag{1}$$

Reference with \cref{fig:label_1} for Fig. 1 and with \cref{tab:label_2} for Table 1. For the beginning of a sentence use \Cref{fig:label_1} for Figure 1 and \Cref{tab:label_2} for Table 1. Reference texts can be adjusted, see package documentation for details. Same for equations \cref{eq:label_3} for Eq. (1) and \Cref{eq:label_3} for Equation (1) for begining of the sentence. Fancy is also \cref{fig:label_1, tab:label_2, eq:label_3} for Fig. 1, Table 1, and Eq. (1). The prefix before the colon is not needed and just added for human readablility. These are shwon in Table 2. A label shoud be as descriptive as possible.

1.2 Indices

Where do group, angle, iteration and spatial indices go? Which symbols shall we use?

1.3 Listings

Look into source code to see how it is done. You can also load code from files directly, even just some lines from the file. See documentation. `https://en.wikibooks.org/wiki/LaTeX/Source_Code_Listings`. I am still working on the styles, this are just examples at the moment

```python
import numpy as np

def incmatrix(genl1,genl2):
    m = len(genl1)
    n = len(genl2)
    M = None #to become the incidence matrix
    VT = np.zeros((n*m,1), int)  #dummy variable

    #compute the bitwise xor matrix
    M1 = bitxormatrix(genl1)
    M2 = np.triu(bitxormatrix(genl2),1)

    for i in range(m-1):
        for j in range(i+1, m):
            [r,c] = np.where(M2 == M1[i,j])
            for k in range(len(r)):
                VT[(i)*n + r[k]] = 1;
                VT[(i)*n + c[k]] = 1;
                VT[(j)*n + r[k]] = 1;
                VT[(j)*n + c[k]] = 1;

                if M is None:
                    M = np.copy(VT)
                else:
                    M = np.concatenate((M, VT), 1)

                VT = np.zeros((n*m,1), int)

    return M
```

Listing 1 Python example

```cpp
#include <stdio.h>
#define N 10
/* Block
 * comment */

int main()
{
    int i;

    // Line comment.
    puts("Hello world!");

    for (i = 0; i < N; i++)
    {
        puts("LaTeX is also great for programmers!");
    }

    return 0;
}
```

Listing 2 C++ example

```
[Mesh]
```

```
  type = GeneratedBIDMesh
  dim = 1
  xmin = 0
  xmax = 2
  nx = 2
  subdomain = '0 1'
[]

[TransportSystems]
  particle = common
  equation_type = steady-state
  G = 1
  VacuumBoundary = 'left right'
  SurfaceSource = '10.0 0'

  [./diffusion]
    scheme = CFEM-Diffusion
    order = FIRST
    family = LAGRANGE
    nonlocal_diffusion_multiapp_file = 'absorber_larsen_trahan_ls.i'
    save_nonlocal_diffusion_coefficient = true

    transport_wrapper = 'ls_transport'
  [../]
[]

[Materials]
  [./strong]
    type = ConstantNeutronicsMaterial
    block = '1'
    sigma_t = 10.0
    sigma_s = 5.0
  [../]
  [./weak]
    type = ConstantNeutronicsMaterial
    block = '0'
    sigma_t = 0.1
    sigma_s = 0.05
  [../]
[]
}
```

Listing 3 Moose input example

1.4 Useful links

1.4.1 Spaces in LaTeX

Table 3 Spacing from `http://tex.stackexchange.com/questions/74353/what-commands-are-there-for-horizontal-spacing`

`a\,b`	a b
`$a\,b$`	$a\,b$
`a\thinspace b`	a b
`$a\thinspace b$`	$a\thinspace b$
`$a\!b$`	$a\!b$
`$a\mkern-\thinmuskip b$`	$a\mkern-\thinmuskip b$
`$a\>b$`	$a\>b$
`$a\mkern\medmuskip b$`	$a\mkern\medmuskip b$
`$a\;b$`	$a\;b$
`$a\mkern\thickmuskip b$`	$a\mkern\thickmuskip b$
`$a\:b$`	$a\:b$
`$a\mkern\medmuskip b$`	$a\mkern\medmuskip b$
`a\enspace b`	a b
`$a\enspace b$`	$a\enspace b$
`a\quad b`	a b
`$a\quad b$`	$a\quad b$
`a\qquad b`	a b
`$a\qquad b$`	$a\qquad b$
`a\hskip 1em b`	a b
`$a\hskip 1em b$`	$a\hskip 1em b$
`a\kern 1pc b`	a b
`$a\kern 1pc b$`	$a\kern 1pc b$
`a\hspace{35pt}b`	a b
`$a\hspace{35pt}b$`	$a\hspace{35pt}b$
`axyzb`	axyzb
`a\hphantom{xyz}b`	a b
`$axyzb$`	$axyzb$
`$a\hphantom{xyz}b$`	$a\hphantom{xyz}b$
`a\ b`	a b
`$a\ b$`	$a\ b$
`a~b`	a b
`$a~b$`	$a\,b$
`a\hfill b`	a b
`$a\hfill b$`	$a\hfill b$

1.5 AMSMath package

Read the documentation on the ams math environments `ftp://ftp.ams.org/pub/tex/doc/amsmath/amsldoc.pdf`

1.6 Plotting

LaTeXsupports plots from csv files. The learning curve is a bit steep, however the results are worth it. Take a look at the pgfplots package `ftp://ftp.ams.org/pub/tex/doc/amsmath/amsldoc.pdf`. I might add a 2 D template for plots later.

2 General commands

Name	Symbol	Command

3 Math

3.1 Parenthesis & Co

Name	Symbol	Command
Parenthesis	$(x \cdot x)$	$\parenthesis{x\cdot x}$
Bracket	$[x \cdot x]$	$\bracket{x\cdot x}$
Bracet	$\{x \cdot x\}$	$\bracet{x\cdot x}$
Angled	$\langle x \cdot x \rangle$	$\angled{x\cdot x}$

3.2 Math symbols

Name	Symbol	Command
Imaginary number	$\hat{\imath}$	\img
Gradient	$\vec{\nabla}$	$\grad$ or $\del$
Adjoint	$\psi^\dagger$	$\adj{\psi}$
Order	$e^{(2)}$	$e\order{2}$

3.3 Functions

Name	Symbol	Command
Divergence	$\vec{\nabla} \cdot \psi$	$\div\psi$

Rotation	$\vec{\nabla} \times \psi$	$\rot\psi$
Vector Norm	$\|\vec{x}\|$	$\norm{\vec{x}}$
	$\|\vec{x}\|_\infty$	$\norm[\infty]{\vec{x}}$
Absolute value	$\|x\|$	$\abs{x}$
e-Function	e^x	$\e{x}$
Power of ten	10^3	$\tento{3}$
Scientific noation	$8.3{\cdot}10^{-4}$	$8.3\E{-4}$
Sign function	sign	$\sign$

3.4 Matrices etc

Name	Symbol	Command
Vector	$\vec{A}$	$\vec{A}$
Matrix	$\mathbf{A}$	$\mat{A}$
Tensor	$\underline{\underline{T}}$	$\tensor{T}$
Function Operator	$\mathbf{L}$	$\op{L}$

3.5 Derivatives

3.5.1 First Derivatives

Name	Symbol	Command
General derivative	$\frac{\partial}{\partial s}$	$\dd{s}$
	$\frac{\partial f}{\partial s}$	$\dd[f]{s}$
x derivative	$\frac{\partial}{\partial x}$	$\ddx$
	$\frac{\partial f}{\partial x}$	$\ddx[f]$

y derivative	$\frac{\partial}{\partial y}$	$\ddy$
	$\frac{\partial f}{\partial y}$	$\ddy[f]$
z derivative	$\frac{\partial}{\partial z}$	$\ddz$
	$\frac{\partial f}{\partial z}$	$\ddz[f]$
t derivative	$\frac{\partial}{\partial t}$	$\ddt$
	$\frac{\partial f}{\partial t}$	$\ddt[f]$

3.6 Second Derivatives

Name	Symbol	Command
General derivative	$\frac{\partial^2}{\partial s^2}$	$\ddd{s}$
	$\frac{\partial^2 f}{\partial s^2}$	$\ddd[f]{s}$
x derivative	$\frac{\partial^2}{\partial x^2}$	$\ddxx$
	$\frac{\partial^2 f}{\partial x^2}$	$\ddxx[f]$
y derivative	$\frac{\partial^2}{\partial y^2}$	$\ddyy$
	$\frac{\partial^2 f}{\partial y^2}$	$\ddyy[f]$
z derivative	$\frac{\partial^2}{\partial z^2}$	$\ddzz$
	$\frac{\partial^2 f}{\partial z^2}$	$\ddzz[f]$
t derivative	$\frac{\partial^2}{\partial t^2}$	$\ddtt$
	$\frac{\partial^2 f}{\partial t^2}$	$\ddtt[f]$

3.7 Integral

Name	Symbol	Command
x Integrate	dx	$\dx$

	ds	$\dx[s]$
y Integrate	dy	$\dy$
z Integrate	dz	$\dz$
t Integrate	dt	$\dt$

3.7.1 Sperhical Integral

Name	Symbol	Command
Sphere	$\mathcal{S}$	\sphere
Agnular weight	ω	$\aqweight$
Sphere integral	$\int_{4\pi}$	$\intsp$
Half sphere integral	$\int_{2\pi}$	$\inthalfsp$
Polar integral	$\int_{-1}^{1}$	$\intpolar$
Negative partial polar integral	$\int_{-1}^{0}$	$\intnpolar$
Positive partial polar integral	$\int_{0}^{1}$	$\intppolar$

3.8 Fractions

Name	Symbol	Command
Halfs	$\frac{1}{2}$	$\half$
	$\frac{3}{2}$	$\half[3]$
Thirds	$\frac{1}{3}$	$\third$
	$\frac{2}{3}$	$\third[2]$
Fourth	$\frac{1}{4}$	$\fourth$
	$\frac{3}{4}$	$\fourth[3]$

4 Symbols

4.1 FEM

Name	Symbol	Command
Domain	$\mathcal{D}$	\domain
Boundary	$\partial\mathcal{D}$	\boundary
Vacuum Boundary	$\partial\mathcal{D}_v$	\rboundary
Reflective Boundary	$\partial\mathcal{D}_r$	\vboundary
Interface Boundary	Γ	\interface
Testfunction	ϕ^*	\testfct
Angular Testfunction	ψ^*	\atestfct
Suface Normal	$\vec{n}$	\normal
Boundary Normal	$\vec{n}_\mathrm{b}$	\bnormal

4.1.1 DFEM

Name	Symbol	Command
Jump	$[\![a]\!]$	$\jump{a}$
Jump 2	$[\![a]\!]$	$\jmpa{a}$
better name here Mean value	$\{\!\{a\}\!\}$	$\meanval{a}$

4.2 Physics

Name	Symbol	Command
Mass flow	$\dot{m}$	\mdot

4.3 Nuclear Symbols

Name	Symbol	Command
S_N	S_N	\sn
	S_8	\sn[8]
P_N	P_N	\pn
	P_8	\pn[8]
Mulitplication factor	k_{eff}	\keff
Infintie multiplication factor	k_{inf}	\kinf

4.4 Transport

Name	Symbol	Command
Streaming direction	$\vec{\Omega}$	\direction
Spatial postion	$\vec{x}$	\position
Current	$\vec{J}$	\current
	$\vec{J}_g$	\current[g]
Positive partial current	$\hat{j}^+$	\ppcurrent
	$\hat{j}_g^+$	\ppcurrent[g]
Negative partial current	$\hat{j}^-$	\npcurrent
	$\hat{j}_g^-$	\npcurrent[g]
Drift vector	$\hat{D}$	\drift
	$\hat{D}_g$	\drift[g]

Diffusion coefficient	D	\DC
	D_g	\DC[g]
Nonlocal diffusion tensor	$\underline{\underline{\mathrm{D}}}$	\DCNL
	$\underline{\underline{\mathrm{D}}}_g$	\DCNL[g]
Total cross section	σ_t	\sigt
	$\sigma_{\mathrm{t},g}$	\sigt[g]
Scattering cross section	σ_s	\sigs
	$\sigma_{\mathrm{s},g}$	\sigs[g]
Fission cross section	σ_f	\sigf
	$\sigma_{\mathrm{f},g}$	\sigf[g]
Removal cross section	σ_r	\sigr
	$\sigma_{\mathrm{r},g}$	\sigr[g]
Absorption cross section	σ_a	\siga
	$\sigma_{\mathrm{a},g}$	\siga[g]
Transport cross section	σ_tr	\sigtr
	$\sigma_{\mathrm{tr},g}$	\sigtr[g]
Scattering moments cross section	σ_l	\sigl{l}
	σ_{lg}	\sigl[g]{l}
Total cross section	Σ_t	\Sigt
	$\Sigma_{\mathrm{t},g}$	\Sigt[g]
Scattering cross section	Σ_s	\Sigs

	$\Sigma_{\mathrm{s},g}$	\Sigs[g]
Fission cross section	Σ_{f}	\Sigf
	$\Sigma_{\mathrm{f},g}$	\Sigf[g]
Removal cross section	Σ_{r}	\Sigr
	$\Sigma_{\mathrm{r},g}$	\Sigr[g]
Absorption cross section	Σ_{a}	\Siga
	$\Sigma_{\mathrm{a},g}$	\Siga[g]
Transport cross section	Σ_{tr}	\Sigtr
	$\Sigma_{\mathrm{tr},g}$	\Sigtr[g]
Scattering moments cross section	Σ_{l}	\Sigl{l}
	Σ_{lg}	\Sigl[g]{l}
Spatial weight function	w	\weight
	w_g	\weight[g]

5 Units

Name	Symbol	Command
Scalar flux	$1\,\frac{1}{\mathrm{cm}^2\mathrm{s}}$	1\sfluxunit
Anglular flux	$2\,\frac{1}{\mathrm{cm}^2\mathrm{s}\cdot\mathrm{st}}$	2\afluxunit
Diffusion coefficient	$3\,\mathrm{cm}$	3\dcunit