Doxygen

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Meeting of the SPECtaculars developers

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Doxygen

- http://www.doxygen.nl/

- write inline-documentation in source code
  - can have Eqn.s in LaTeX (just like "!latex" SPEC docs)

- „`Doxyfile`" controls what and how the documentation (HTML, LaTeX, …) is generated

- supports many languages (C/C++, Java, Python, Fortran, ...) => can document Utilities using the same annotation scheme

- used for e.g. V3FIT, L-BFGS-B

Mapping of SPEC docs

- !latex → !>

- μ → \f$\mu\f$

- \be … \ee → \f{eqnarray}{ … \f}

- {enumerate} \item … →   ... … (HTML)

- \verb+...+ --> \c ...

- New doc features for SPEC
  - Bibliography, Todo list, Modules, search function, automagically consistent references ("called by ...", "calls ...")

- Much more details in the doxygen manual: http://www.doxygen.nl/manual/index.html

Doxygen as used in SPEC

- github-actions: doxygen-action , doxygen.yaml

- manual generation:
  - run 'doxygen' in folder where `Doxyfile` is located
  - output folders: '`docs/html`' and '`docs/latex`'
  - HTML output can be viewed in browser;
    entry point: `docs/html/index.html`
  - LaTeX output has to be compiled first:
    - in '`docs/latex`', run '`make`' **-->** `docs/latex/refman.pdf`

- by default, include all `*.md` files as separate pages

LaTeX specials in Doxygen

- include extra LaTeX packages:
  --> look into `defaults_mathjax.js`

- colors:
  include at top in file (e.g. matrix.f90)
  ```
  !> \latexonly
  !> \definecolor{Orange}{rgb}{1.0,0.5,0.0}
  !> \definecolor{Cerulean}{rgb}{0.0,0.5,1.0}
  !> \endlatexonly
  ```
  and then as usual: `{\color{Orange} A_{\theta,o,i,l}}`

- bibliography: `spec_refs.bib`

some Doxyfile settings

- PROJECT_NAME, PROJECT_NUMBER, PROJECT_BRIEF, PROJECT_LOGO
- OUTPUT_DIRECTORY = docs
- OPTIMIZE_FOR_FORTRAN = YES
- MARKDOWN_SUPPORT = YES
- CITE_BIB_FILES = spec_refs.bib
- EXCLUDE = *_p.f90
- USE_MDFILE_AS_MAINPAGE = README.md
- SOURCE_BROWSER = NO, INLINE_SOURCES = NO, VERBATIM_HEADERS = NO
- REFERENCED_BY_RELATION = YES, REFERENCES_RELATION = YES
- GENERATE_HTML = YES
    - USE_MATHJAX = YES
    - MATHJAX_RELPATH = https://cdnjs.cloudflare.com/ajax/libs/mathjax/3.0.0/
    - MATHJAX_CODEFILE = defaults_mathjax.js
- GENERATE_LATEX = YES
- ENABLE_PREPROCESSING = NO
- HAVE_DOT = YES
    - CALL_GRAPH = YES, CALLER_GRAPH = YES, DOT_IMAGE_FORMAT = svg
    - DOT_GRAPH_MAX_NODES = 10000

Things to keep in mind...

- Doxygen treats files and subroutines differently (more than one subroutine could be in a file) --> need to document file and routines in it individually (separated by blank line !)

- link to other routines: append '()', e.g. `xspech()`

- '!>' --> document   next   item
  '!<' --> document previous item