

Лабораторная работа №6

Дисциплина: Computer Skills for Scientific Writing

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1 Цель работы

Изучить работу с библиографией. Освоить пакеты *natbib*, *biblatex* и инструменты *bibtex*, *biber*.

2 Задание

1. Reference databases.
2. The BibTeX workflow with natbib.
3. The biblatex workflow.

3 Выполнение лабораторной работы

3.0.1 Reference databases

Первым делом мы создали файл *learnlatex.bib*, который является справочной базой данных. Он содержит несколько записей, по одной на каждую ссылку, и в каждой записи есть несколько полей.

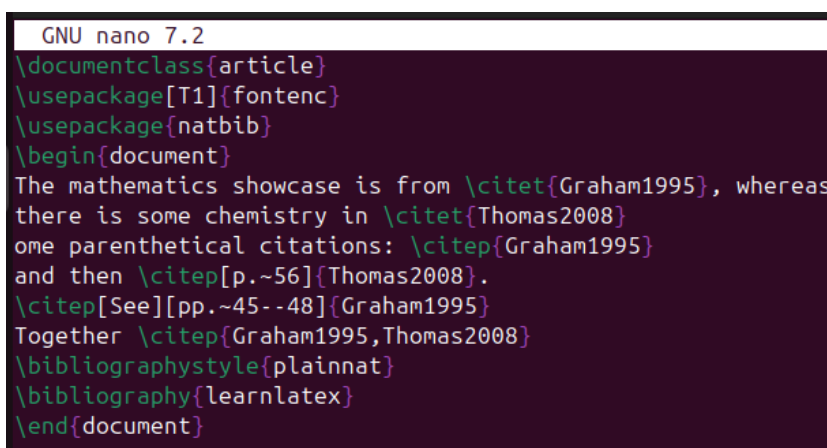


```
GNU nano 2.2 learnlatex.bib
@article{Thomas2008,
  author = {Thomas, Christine M. and Liu, Tianbiao and Hall, Michael B. and Darenbourg, Marcetta Y.},
  title = {Series of Mixed Valent  $\text{Fe(II)Fe(III)}$  Complexes That Model the  $\text{H(2O)}_2$  State of  $\text{[(FeFe)]Hydrogenase}$ : Redox Properties, Density-Functional Theory Investigation, and Reactivity with Extracellular Electron Acceptors},
  journal = {Inorg. Chem.},
  year = {2008},
  volume = {47},
  number = {15},
  pages = {7809-7824},
  doi = {10.1021/ci800654a},
}
@book{Graham1995,
  author = {Ronald L. Graham and Donald E. Kuth and Oren Patashnik},
  title = {Concrete Mathematics},
  publisher = {Addison-Wesley},
  year = {1995},
}
```

Figure 3.1: learnlatex.bib

3.0.2 The BibTeX workflow with natbib

Далее мы использовали нашу справочную базу данных с помощью пакета *natbib*.



```
GNU nano 7.2
\documentclass{article}
\usepackage[T1]{fontenc}
\usepackage{natbib}
\begin{document}
The mathematics showcase is from \citet{Graham1995}, whereas
there is some chemistry in \citet{Thomas2008}
ome parenthetical citations: \citep{Graham1995}
and then \citep[p.~56]{Thomas2008}.
\citep[See][pp.~45--48]{Graham1995}
Together \citep{Graham1995,Thomas2008}
\ bibliographystyle{plainnat}
\ bibliography{learnlatex}
\end{document}
```

Figure 3.2: biblio.tex

После первой компиляции появились ошибки отсутствия библиографии.

```
daavetisyan@ubuntu:~/work/2025-2026/Computer Skills for Scientific Writing/labs/lab06$ pdflatex biblio.tex
This is pdfTeX, Version 3.141592653-2.6-1.40.25 (TeX Live 2023/Debian) (preloaded format=pdflatex)
 restricted \write18 enabled.
entering extended mode
./biblio.tex
LaTeX2e <2023-11-01> patch level 1
L3 programming layer <2024-01-22>
(/usr/share/texlive/texmf-dist/tex/latex/base/article.cls
Document Class: article 2023/05/17 v1.4n Standard LaTeX document class
(/usr/share/texlive/texmf-dist/tex/latex/base/size10.clo))
(/usr/share/texlive/texmf-dist/tex/latex/base/fontenc.sty)
(/usr/share/texlive/texmf-dist/tex/latex/natbib/natbib.sty)
(/usr/share/texlive/texmf-dist/tex/latex/l3backend/l3backend-pdfTeX.def)
No file biblio.aux.

Package natbib Warning: Citation 'Graham1995' on page 1 undefined on input line
5.

Package natbib Warning: Citation 'Thomas2008' on page 1 undefined on input line
6.

Package natbib Warning: Citation 'Graham1995' on page 1 undefined on input line
7.

Package natbib Warning: Citation 'Thomas2008' on page 1 undefined on input line
8.

Package natbib Warning: Citation 'Graham1995' on page 1 undefined on input line
9.

Package natbib Warning: Citation 'Graham1995' on page 1 undefined on input line
10.

Package natbib Warning: Citation 'Thomas2008' on page 1 undefined on input line
10.

No file biblio.bbl.

Package natbib Warning: There were undefined citations.
```

Figure 3.3: Первая компиляция biblio.tex

Для создания библиографии мы использовали инструмент *bibtex*.

```
daavetisyan@ubuntu:~/work/2025-2026/Computer Skills for Scientific Writing/labs/lab06$ bibtex biblio
This is BibTeX, Version 0.99d (TeX Live 2023/Debian)
The top-level auxiliary file: biblio.aux
The style file: plainnat.bst
Database file #1: learnlatex.bib
```

Figure 3.4: Использование bibtex

После повторной компиляции pdf-файл создавался безошибочно.


```

daavetisyan@ubuntu:~/work/2025-2026/Computer Skills for Scientific Writing/labs/lab06$ pdflatex biblio.tex
This is pdfTeX, Version 3.141592653-2.6-1.40.25 (TeX Live 2023/Debian) (preloaded format=pdflatex)
 restricted \write18 enabled.
entering extended mode
./biblio.tex
LaTeX2e <2023-11-01> patch level 1
L3 programming layer <2024-01-22>
(/usr/share/texlive/texmf-dist/tex/latex/base/article.cls
Document Class: article 2023/05/17 v1.4n Standard LaTeX document class
(/usr/share/texlive/texmf-dist/tex/latex/base/size10.clo))
(/usr/share/texlive/texmf-dist/tex/latex/base/fontenc.sty)
(/usr/share/texlive/texmf-dist/tex/latex/natbib/natbib.sty)
(/usr/share/texlive/texmf-dist/tex/latex/l3backend/l3backend-pdftex.def)
./biblio.aux) (./biblio.bbl) [1{/var/lib/texmf/fonts/map/pdftex/updmap/pdftex.
map}{/usr/share/texmf/fonts/enc/dvips/cm-super/cm-super-t1.enc}] (./biblio.aux)
)</usr/share/texmf/fonts/type1/public/cm-super/sfbx1440.pfb></usr/share/texmf/
fonts/type1/public/cm-super/sfrn1000.pfb></usr/share/texmf/fonts/type1/public/c
m-super/sfti1000.pfb>
Output written on biblio.pdf (1 page, 53727 bytes).
Transcript written on biblio.log.

```

Figure 3.5: Повторная компиляция biblio.tex

The mathematics showcase is from Graham et al. [1995], whereas there is some chemistry in Thomas et al. [2008] ome parenthetical citations: [Graham et al., 1995] and then [Thomas et al., 2008, p. 56]. [See Graham et al., 1995, pp. 45–48] Together [Graham et al., 1995, Thomas et al., 2008]

References

Ronald L. Graham, Donald E. Knuth, and Oren Patashnik. *Concrete Mathematics*. Addison-Wesley, 1995.

Christine M. Thomas, Tianbiao Liu, Michael B. Hall, and Marcetta Y. Darensbourg. Series of mixed valent Fe(II)Fe(I) complexes that model the H(OX) state of [FeFe]hydrogenase: Redox properties, density-functional theory investigation, and reactivity with extrinsic CO. *Inorg. Chem.*, 47(15):7009–7024, 2008. doi: 10.1021/ic800654a.

Figure 3.6: biblio.pdf

3.0.3 The biblatex workflow

Затем мы использовали нашу справочную базу данных с помощью другого пакета - *biblatex*.

```

GNU nano 7.2
\documentclass{article}
\usepackage[T1]{fontenc}
\usepackage[style=authoryear]{biblatex}
\addbibresource{learnlatex.bib} % file of reference info
\begin{document}
The mathematics showcase is from \autocite{Graham1995}.
Some more complex citations: \parencite{Graham1995} or
\textcite{Thomas2008} or possibly \citetitle{Graham1995}.
\autocite[56]{Thomas2008}
\autocite[See][45-48]{Graham1995}
Together \autocite{Thomas2008,Graham1995}
\printbibliography
\end{document}

```

Figure 3.7: biblio2.tex

Аналогично после первой компиляции появились ошибки отсутствия библиографии.

```

daavetisyan@ubuntu:~/work/2025-2026/Computer Skills for Scientific Writing/labs/lab06$ pdflatex biblio2.tex
This is pdfTeX, Version 3.141592653-2.6-1.40.25 (TeX Live 2023/Debian) (preloaded format=pdflatex)
 restricted \write18 enabled.
entering extended mode
./biblio2.tex
LaTeX2e <2023-11-01> patch level 1
L3 programming layer <2024-01-22>
(/usr/share/texlive/texmf-dist/tex/latex/base/article.cls
Document Class: article 2023/05/17 v1.4n Standard LaTeX document class
(/usr/share/texlive/texmf-dist/tex/latex/base/size10.clo)
(/usr/share/texlive/texmf-dist/tex/latex/base/fontenc.sty)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/biblatex.sty
(/usr/share/texlive/texmf-dist/tex/generic/pdfxcmds/pdfxcmds.sty
(/usr/share/texlive/texmf-dist/tex/generic/infwarerr/infwarerr.sty)
(/usr/share/texlive/texmf-dist/tex/generic/iftex/iftex.sty)
(/usr/share/texlive/texmf-dist/tex/generic/ltxcms/ltxcms.sty))
(/usr/share/texlive/texmf-dist/tex/latex/etoolbox/etoolbox.sty)
(/usr/share/texlive/texmf-dist/tex/latex/graphics/keyval.sty)
(/usr/share/texlive/texmf-dist/tex/latex/kvoptions/kvoptions.sty
(/usr/share/texlive/texmf-dist/tex/latex/kvsetkeys/kvsetkeys.sty))
(/usr/share/texlive/texmf-dist/tex/latex/logreq/logreq.sty
(/usr/share/texlive/texmf-dist/tex/latex/logreq/logreq.def))
(/usr/share/texlive/texmf-dist/tex/latex/base/iftthen.sty)
(/usr/share/texlive/texmf-dist/tex/latex/url/url.sty)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/bbx-dm.def)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/bbx-compat.def)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/biblatex.def)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/bbx/authoryear.bbx
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/bbx/standard.bbx))
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/cbx/authoryear.cbx)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/biblatex.cfg)
(/usr/share/texlive/texmf-dist/tex/latex/l3kernel/expl3.sty
(/usr/share/texlive/texmf-dist/tex/latex/l3backend/l3backend-pdftex.def))
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/bbx-case-expl3.sty
(/usr/share/texlive/texmf-dist/tex/latex/l3packages/xparse/xparse.sty)))
No file biblio2.aux.
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/lbx/english.lbx)
No file biblio2.bbl.

LaTeX Warning: Citation 'Graham1995' on page 1 undefined on input line 6.

LaTeX Warning: Citation 'Graham1995' on page 1 undefined on input line 7.

LaTeX Warning: Citation 'Thomas2008' on page 1 undefined on input line 8.

```

Figure 3.8: Первая компиляция biblio2.tex

Для созданий библиографии мы использовали другой инструмент *biber*.

```

daavetisyan@ubuntu:~/work/2025-2026/Computer Skills for Scientific Writing/labs/lab06$ biber biblio2
INFO - This is Biber 2.19
INFO - Logfile is 'biblio2.blg'
INFO - Reading 'biblio2.bcf'
INFO - Found 2 citekeys in bib section 0
INFO - Processing section 0
INFO - Looking for bibtex file 'learnlatex.bib' for section 0
INFO - LaTeX decoding ...
INFO - Found BibTeX data source 'learnlatex.bib'
INFO - Overriding locale 'en-US' defaults 'normalization = NFD' with 'normalization = prenormalized'
INFO - Overriding locale 'en-US' defaults 'variable = shifted' with 'variable = non-ignorable'
INFO - Sorting list 'nyt/global/global/global' of type 'entry' with template 'nyt' and locale 'en-US'
INFO - No sort tailoring available for locale 'en-US'
INFO - Writing 'biblio2.bbl' with encoding 'UTF-8'
INFO - Output to biblio2.bbl

```

Figure 3.9: Использование biber

После повторной компиляции pdf-файл создался безошибочно.

```

daavetisyan@ubuntu:~/work/2025-2026/Computer Skills for Scientific Writing/labs/lab06$ pdflatex biblio2.tex
This is pdfTeX, Version 3.141592653-2.6-1.40.25 (TeX Live 2023/Debian) (preloaded format=pdflatex)
 restricted \write18 enabled.
entering extended mode
./biblio2.tex
LaTeX2e <2023-11-01> patch level 1
L3 programming layer <2024-01-22>
(/usr/share/texlive/texmf-dist/tex/latex/base/article.cls
Document Class: article 2023/05/17 v1.4n Standard LaTeX document class
(/usr/share/texlive/texmf-dist/tex/latex/base/size10.clo))
(/usr/share/texlive/texmf-dist/tex/latex/base/fontenc.sty)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/biblatex.sty
(/usr/share/texlive/texmf-dist/tex/generic/pdfdoccmds/pdfdoccmds.sty
(/usr/share/texlive/texmf-dist/tex/generic/infwarerr/infwarerr.sty)
(/usr/share/texlive/texmf-dist/tex/generic/iftex/iftex.sty)
(/usr/share/texlive/texmf-dist/tex/generic/ltxcmds/ltxcmds.sty))
(/usr/share/texlive/texmf-dist/tex/latex/etoolbox/etoolbox.sty)
(/usr/share/texlive/texmf-dist/tex/latex/graphics/keyval.sty)
(/usr/share/texlive/texmf-dist/tex/latex/kvoptions/kvoptions.sty
(/usr/share/texlive/texmf-dist/tex/latex/kvsetkeys/kvsetkeys.sty))
(/usr/share/texlive/texmf-dist/tex/latex/logreq/logreq.sty
(/usr/share/texlive/texmf-dist/tex/latex/logreq/logreq.def))
(/usr/share/texlive/texmf-dist/tex/latex/base/iftthen.sty)
(/usr/share/texlive/texmf-dist/tex/latex/url/url.sty)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/blx-dm.def)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/blx-compat.def)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/biblatex.def)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/bbx/authoryear.bbx
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/bbx/standard.bbx))
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/cbx/authoryear.cbx)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/biblatex.cfg)
(/usr/share/texlive/texmf-dist/tex/latex/l3kernel/expl3.sty
(/usr/share/texlive/texmf-dist/tex/latex/l3backend/l3backend-pdf.tex.def))
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/blx-case-expl3.sty
(/usr/share/texlive/texmf-dist/tex/latex/l3packages/xparse/xparse.sty)))
./biblio2.aux)
(/usr/share/texlive/texmf-dist/tex/latex/biblatex/lbx/english.lbx)
./biblio2.bbl)
Overfull \hbox (0.81833pt too wide) in paragraph at lines 6--13
\T1/cmr/m/n/10 Some more com-plex ci-ta-tions: ([[]Gra-ham, Knuth, and Patash-ni
k 1995) or [[]Thomas
(/usr/share/texlive/texmf-dist/tex/latex/base/t1cmtt.fd) [1{/var/lib/texmf/font
s/map/pdf/tex/updmap/pdf.tex.map}]{/usr/share/texmf/fonts/enc/dvips/cm-super/cm-su
per-t1.enc}] (./biblio2.aux) )
(see the transcript file for additional information)</usr/share/texmf/fonts/typ
e1/public/cm-super/sfbx1440.pfb></usr/share/texmf/fonts/type1/public/cm-super/s
fcm1000.pfb></usr/share/texmf/fonts/type1/public/cm-super/sfrm1000.pfb></usr/sh

```

Figure 3.10: Повторная компиляция biblio2.tex

The mathematics showcase is from (Graham, Knuth, and Patashnik 1995). Some more complex citations: (Graham, Knuth, and Patashnik 1995) or Thomas et al. (2008) or possibly *Concrete Mathematics*. (Thomas et al. 2008, p. 56) (See Graham, Knuth, and Patashnik 1995, pp. 45–48) Together (Thomas et al. 2008; Graham, Knuth, and Patashnik 1995)

References

- Graham, Ronald L., Donald E. Knuth, and Oren Patashnik (1995). *Concrete Mathematics*. Addison-Wesley.
- Thomas, Christine M. et al. (2008). “Series of Mixed Valent Fe(II)Fe(I) Complexes That Model the H(OX) State of [FeFe]Hydrogenase: Redox Properties, Density-Functional Theory Investigation, and Reactivity with Extrinsic CO”. In: *Inorg. Chem.* 47.15, pp. 7009–7024. DOI: 10.1021/ic800654a.

Figure 3.11: biblio2.pdf

4 Выводы

Я изучил работу с библиографией. Освоил пакеты *natbib*, *biblatex* и инструменты *bibtex*, *biber*.