

Bibcheck is a Lua-based script that checks each  $\backslash$ bibitem of a  $\LaTeX$  file (tex) against MathSciNet and zbMATH, and writes all checked entries into a  $\BibTeX$  file (bib).

Bibcheck is available at <https://github.com/ems-press/bibcheck>.

For bug reports, comments and suggestions contact [Simon Winter](#).

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## 1 Installation

### 1.1 Install Lua on Windows (version 5.1 or higher)

1. Download LuaForWindows\_v5.1.5-52.exe (27.8 MB) at <https://github.com/rjpcomputing/luaforwindows/releases/tag/v5.1.5-52>
2. Run the exe file and always click 'accept/next'.

### 1.2 Install WGet on Windows (version 1.14 or higher)

1. Download from <https://eternallybored.org/misc/wget/> the exe (!) file of Version 1.21 (32-bit or 64-bit).
2. Copy wget.exe to e.g. C:\Program Files (x86)\wget-1.21.1-1-win64\ or any other folder.
3. Add WGet to the Windows PATH:
  - (a) Open the Start Search, type in 'env' and choose 'Edit the system environment variables'.
  - (b) Click the 'Environment Variables' button.
  - (c) Under 'System Variables' find the row with 'Path' in the first column and click edit.
  - (d) Click 'New' and type in the new path, e.g. C:\Program Files (x86)\wget-1.21.1-1-win64
  - (e) Dismiss all of the dialogs by choosing OK. Your changes are saved.
4. To check if the installation was successful, open a command terminal (by typing 'cmd' in the search menu) and type e.g.

```
wget --no-check-certificate -qO- "https://mathscinet.ams.org/mathscinet-mref?
dataType=bibtex&ref=Whitehead, On 2-spheres in 3-manifolds, Bull. Amer. Math."
```

without space or line break after the question mark.

### 1.3 Install Bibcheck

1. Create a new folder for Bibcheck. *The whole path must not contain any spaces!*
2. Copy all three Lua files into the Bibcheck folder: bibcheck.lua, config.lua, functions.lua
3. Download dkjson.lua (v2.5) from <http://dkolf.de/src/dkjson-lua.fsl/home> and copy the file into the Bibcheck folder.<sup>1</sup>

### 1.4 Note for Mac users

1. To install Lua and WGet, Mac users should use the package manager [Homebrew](#).
2. See [Method #1](#) on how to install Homebrew and WGet.
3. After installing Lua, the two Lua libraries ‘LuaFileSystem’ and ‘Penlight’ might be missing. Then run:  

```
brew install luarocks
luarocks install luafilesystem
luarocks install penlight
```

## 2 How to use Bibcheck

### 2.1 Case 1: Your tex file contains \bibitem's

1. Open the Command Terminal, go to the paper's directory and write  
`lua PATH\bibcheck.lua MAINFILE.tex BSTFILENAME`  
e.g. on Windows:  
`lua C:\tools\bibcheck\bibcheck.lua main.tex emss`  
*Note: The whole path must not contain any spaces!*
2. The script will run for a few seconds. What happens is the following: Every \bibitem in main.tex is compared with MathSciNet.
  - If there is a match, this **match** is written into a BibTeX file.
  - If there is no match, the **original entry** is written into the BibTeX file.
3. Next, an automatic run of latex and bibtex creates a bbl file. This bbl file is pasted into the original tex file main.tex., which is then renamed main\_bibchecked.tex.
4. Now you can start editing the new (‘bibchecked’) tex file. For this, *you must check each \bibitem*:
  - If there was a **MathSciNet match**, the original entry appears as a comment (%) below the match. It is important to compare the original entry and the match because sometimes MathSciNet delivers a wrong result. However, a quick comparison of e.g. the page range provides clarity. Or, if the original entry has an MR number, you can compare it with the MR number of the match.
  - If there was **no MathSciNet match**, the entry is now at the beginning of the bibliography. This means, you have to (a) sort this entry and (b) format it by hand. This is a disadvantage of the tool; but it happens to only a few entries.
5. In addition, each \bibitem is compared with zbMATH and (if there was a match) extended by the respective number. But again: You must compare the original entry and the zbMATH match (which also appears below the match as a comment) to ensure that both describe the same publication.
6. That's it!

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<sup>1</sup>Mac users could probably use luarocks to install dkjson.lua; see §1.4.

## 2.2 Case 2: Your tex file uses a BibTeX file

1. Write: `\bibliographystyle{emss} \bibliography{name-of-your-bib-file}`
2. Run bibtex and copy the bbl content into the tex file.
3. Proceed as in Case 1.

## 2.3 Case 3: Your tex file uses amsrefs

1. If your tex file contains `\usepackage{amsrefs}`, the entries of the bibliography must be first converted to a BibTeX file. This can be done
  - by hand,
  - using the **L3 attempt** or
  - using **ltb2bib**.
2. Proceed as in Case 2.

## 2.4 Use a bat file on Windows

Instead of using the Command Terminal, you can create and use a bat file:

1. Create, using any text editor, a file bibcheck.bat containing the following four lines:

```
@echo off
chcp 65001
lua "C :...\ bibcheck.lua" %~f1 emss
pause
```

Here C :...\ bibcheck.lua is the full path of bibcheck.lua. Keep the quotation marks!

2. Create a desktop shortcut of that batch file.
3. Now drag and drop your tex file onto the desktop shortcut. Easy!

## 3 What to pay attention to

1. Before you bibcheck a tex file, you should
  - replace each `\bysame` by the respective authors.
2. Be aware of **mismatches**. They mainly appear when
  - the original entry is a preprint (e.g. arXiv) and MathSciNet returns a journal article with the same title;
  - the original entry is the original version (e.g. in Russian) and MathSciNet returns the English translation, or the other way around;
  - the original entry and the MathSciNet match have a very similar title, maybe even the same author, but are different.
3. The bibliography in main\_bibchecked.tex is based on MathSciNet. Here are some known problems with MathSciNet:
  - Book series are often not abbreviated; so you must abbreviate them by hand following <https://www.siam.org/Portals/0/Journal%20PDFs/serials.pdf>.
  - Write always ‘Springer’, avoid ‘Springer-Verlag’, ‘Springer Verlag’, etc.
  - Some Astérisque papers are of entry type @incollection containing a field journal:

```
@incollection {Shelstad1989,
  AUTHOR = {Shelstad, D.},
  TITLE = {A formula for regular unipotent germs},
  NOTE = {Orbites unipotentes et repr{\{e\}}sentations, II},
  JOURNAL = {Ast{\{e\}}risque},
  FJOURNAL = {Ast{\{e\}}risque},
  NUMBER = {171-172},
```

```

YEAR = {1989},
PAGES = {275--277},
ISSN = {0303-1179},
MRCLASS = {22E35 (11F70 11R39 11S37)},
MRNUMBER = {1021506},
MRREVIEWER = {Joe Repka},
}

```

**Officially**, `journal` is not an allowed field for `@incollection`. Thus, bst files (such as `emss.bst`) will not print `journal`, they rather expect a field `booktitle`. In this case, the name ‘Astérisque’ has to be restored by hand.

4. The hit rate with `zbMATH` is not as high as with `MathSciNet`. This means: Not all publications listed in `zbMATH` are found. In this case, a manual search often helps: <https://zbmath.org/citationmatching/>. Here, the hit probability increases if you only enter *parts* of the `\bibitem`.

## 4 Noteworthy

1. MR numbers are returned without leading zero, e.g. `\MR{0553218} → \MR{553218}`.
2. The temporary `BibTeX` file (created by `Bibcheck`) contains the MR and `zbMATH` numbers:

```
zblnumber = {1460.22007}, mrnumber = {4028458}
```

Your bst file must know how to deal with these entries. If, for instance, you use `emss.bst`, the final `\bibitem` (of `main_bibchecked.tex`) will contain

```
\Zbl{1460.22007} \MR{4028458}
```

The tex file (resp. cls/sty file), in turn, must have a definition for the commands `\Zbl` and `\MR`.

Thus, if you don’t need any `zbMATH` numbers, you may either

- use a bst file that ignores the field `zblnumber`, or
  - define `\newcommand\Zbl[1]{}`, or
  - open `config.lua` and set `M.printZbl = false` (then the comparison with `zbMATH` is not made in the first place and `Bibcheck` runs much faster).
3. When running `bibcheck`, you may skip the last argument (`BSTFILENAME`). This will activate the default bibliography style as defined in `config.lua`.

## 5 Changelog

- Version 1.1
  - `split_at_bibitem`: removes blank lines inside any `\bibitem`.
  - `make_bib` and `space_warning`: removes spaces in `\bibitem` labels and adds a warning in `main_bibchecked.tex`.
  - `make_bib` and `undress`: removes curly braces and tex commands of the form `\XYZ` before it sends each `\bibitem` to the `zbMATH` Citation Matcher.
  - `zbl_ID`: Bug fixed.
  - `escape_percents`: Function added; otherwise strings such as `\%3` (e.g. in URLs) wouldn’t work in Lua 5.1.