

# Bibcheck

Manual for Version 1.3 – last updated on 9 March 2023

Bibcheck is a Lua-based script that checks each `\bibitem` of a `.tex` file against MathSciNet, zbMATH, and Crossref, and creates the bibliography based on a `.bst` file.

Bibcheck is available at [GitHub](#). For bug reports, comments and suggestions contact [Simon Winter](#).

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## 1 Installation

### 1.1 Install Lua v5.1 (or higher) on Windows

1. Download [LuaForWindows\\_v5.1.5-52.exe](#) (27.8 MB).
2. Run the `.exe` file and always click 'accept/next'.

### 1.2 Install Wget v1.14 (or higher) on Windows

1. Download the `.exe` (!) file of [Wget](#) (32-bit or 64-bit). (Tested with Version 1.21.)
2. Copy `wget.exe` to, say, `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, say, `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 whether the installation was successful, open a command terminal (by typing 'cmd' in the search menu) and type
 

```
wget -qO-
"https://mathscinet.ams.org/mathscinet-mref?dataType=bibtex&ref=J. Whitehead,
On 2-spheres in 3-manifolds. Bull. Amer. Math. Soc. 64 (1958), 161--166"
```

or

```
wget -qO-  
"https://zbmath.org/citationmatching/match?f=latex&q=J. Whitehead,  
On 2-spheres in 3-manifolds. Bull. Amer. Math. Soc. 64 (1958), 161--166"
```

in both cases without any line break. The return should be MR 103473 resp. Zbl 0084.19103.

If this does not work, try again with `wget --no-check-certificate -qO- ...`. If only this works, see §1.4.4.

### 1.3 Install Lua and Wget on Mac/Linux

1. We recommend to 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
```

### 1.4 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 the .lua file [dkjson.lua](#) and copy it into the Bibcheck folder. (Tested with Version 2.5.)<sup>1</sup>
4. It could be (e.g., under Windows 11) that you need to replace ‘`wget -qO-`’ in line 112 and/or 123 of bibcheck.lua by ‘`wget --no-check-certificate -qO-`’; see the test described in §1.2.4.<sup>2</sup>

## 2 How to use Bibcheck

### 2.1 Case 1: \bibitem’s

If your .tex file contains a thebibliography environment<sup>3</sup>, proceed as follows:

1. Open the command terminal, go to the paper’s directory and write  

```
lua path\bibcheck.lua main.tex bstfilename
```

  
e.g., on Windows:  

```
lua C:\tools\bibcheck\bibcheck.lua main.tex ems
```

  
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 .bib file.
  - If there is no match, the **original entry** is written into the .bib 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.

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<sup>1</sup>Mac users could probably use luarocks to install dkjson.lua; see §1.3.3.

<sup>2</sup>This will be improved in the next version of Bibcheck.

<sup>3</sup>This is the default case for Bibcheck.

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!

## 2.2 Case 2: BibTeX

If there is a .bib file, say bibsource.bib, proceed as follows:

1. In the main .tex file write:
 

```
\bibliographystyle{ems}
\bibliography{bibsource}
```
2. Run bibtex to create bibsource.bbl.
3. Copy the content of bibsource.bbl into the .tex file.
4. Proceed as in Case 1.<sup>4</sup>

## 2.3 Case 3: amsrefs

If the bibliography is prepared using the amsrefs package, proceed as follows:

1. Copy all \bib entries into a new .ltb file, say source.ltb.
2. Create a temporary .tex file, say temp.tex, consisting of the following lines:<sup>5</sup>

```
\documentclass{article}
\usepackage{amsrefs,ltb2bib}
\begin{document}
\begin{bibdiv}
\begin{biblist}
\bibselect*{source}
\end{biblist}
\end{bibdiv}
\writebib{source}{bibsource}
\end{document}
```
3. Compile temp.tex. This will create a .bib file bibsource.bib containing all \bib entries from source.ltb.
 

**Warning:** The resulting .bib file is not perfect: wrong brackets around author names, wrong structure of @InCollection entries, capitalization of proper names is lost (due to missing brackets), and maybe more. However, these conversion errors should have little effect on the hit rate in MathSciNet and zbMATH.
4. In the *original* .tex file (say, main.tex), replace the bibliography by
 

```
\bibliographystyle{ems}
\bibliography{bibsource}
```
5. Run bibtex. But before you do this, you must remove \usepackage{amsrefs} (otherwise the .bib file will be in amsrefs format).

<sup>4</sup>Isn't this procedure totally cumbersome? Yes, it is. Maybe someday a new version of Bibcheck will make it better.

<sup>5</sup>The reason we create a new .tex file is that there is a conflict with the \title command: if the .tex file contains \title, then all article and book titles disappear when converting ltb to bib.

6. Copy the content of `main.bbl` into the `.tex` file.
7. Now you can finally use Bibcheck as in Case 1.
8. **Warning:** What Bibcheck considers to be the “original entry” is of course only the entry from the defective `.bib` file created in step 2.3.3. Therefore, in cases of doubt, the original *manuscript* should be consulted for comparison.<sup>6</sup>

## 2.4 Use a .bat file on Windows

Instead of using the command terminal, you can create and use a batch file (.bat):

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

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

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

2. Create a desktop shortcut of that .bat 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 according the **MathSciNet standard**.
  - Write ‘Springer’ instead of ‘Springer-Verlag’, ‘Springer Verlag’, etc. Same with ‘Birkhäuser’: remove ‘Verlag’.
  - 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},
}
```

---

<sup>6</sup>Instead of using this `lbt2bib` approach, it might make more sense to use the `\bib` entries from `amsrefs` as the input for Bibcheck (i.e. without the detour via `BibTeX`). One probably only has to remove the fields names (`author=`, `title=`, etc.) and replace `\bib` with `\bibitem`. Maybe Bibcheck will be able to do that in one of the next versions.

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

- MR numbers are returned without leading zero, e.g., `\MR{0553218} → \MR{553218}`.
- zbMATH**: 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 using the **zbMATH Citation Matcher** often leads to success. The hit probability increases if you only enter *parts* of the `\bibitem`.

- Crossref**: If the MathSciNet match does not contain any DOI, the original entry is sent to the Crossref API. **NEW**  
Crossref always returns *one* DOI, which will be added to `main_bibchecked.tex` as a comment together with the so-called ‘relevance score’.

The relevance score is an indicator of how likely the DOI provided by Crossref really is the DOI you are looking for. Treat the DOIs provided by Crossref with caution: they must not be adopted without verification.

Only if the DOI is the correct one, copy the complete URL around the title:

```
\href{https://doi.org/10.4171/ggd/702}{On the Basilica operation}
```

If neither the MathSciNet API nor the Crossref API provide a matching DOI, then it is quite likely that the publication has no DOI. However, you can still manually search for one, for example using the **Crossref Metadata Search**.

## 4 The config file

- When running `bibcheck`, you may skip the last argument (`BSTFILENAME`). This will activate the default bibliography style as defined in `config.lua`:

```
M.bibstyle = 'ems'
```

- The temporary `.bib` file contains the MR and zbMATH numbers:

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

If your `.bst` file knows how to deal with such entries (e.g., `ems.bst` does), the final `\bibitem` will contain

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

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

This means, if you do not need any zbMATH numbers, you may either

- use a `.bst` file that ignores the field `zblnumber`, or
- define `\newcommand\Zbl[1]{}{}`, or
- change the respective line in `config.lua` to

```
M.checkzbMATH = false
```

The latter option disables the comparison with zbMATH and makes Bibcheck run much faster!

- If you do not need DOIs,
  - use a `.bst` file that ignores the field `doi`, *and*
  - change the respective line in `config.lua` to

```
M.checkCrossref = false
```

- By default the resulting `.tex` file has the suffix `_bibchecked`. This value can be changed in `config.lua`: **NEW**  

```
M.suffix = '_bibchecked'
```

5. If you want to *keep* the temporary .bib file, remove the line '.bib' from the M.remove\_files list in config.lua (or add the comment sign --): **NEW**

```
M.remove_files = {  
  -- '.bib',  
  '.bbl',  
  '.aux',  
  '.log',  
  '.dvi',  
  '.blg',  
}
```

However, we strongly recommend *not* to continue working with the .bib file, but always with the .tex file (main\_bibchecked.tex) since the .tex file contains important comments (%), which are missing in the .bib file.

## 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: curly braces and tex commands of the form \XYZ removed before the \bibitem is sent to the zbMATH Citation Matcher.
  - zbl\_ID: Bug fixed.
  - escape\_percents: Function added; otherwise strings such as \%3 (e.g., in URLs) would not work in Lua 5.1.
- Version 1.2
  - make\_bib and undress: further simplify each \bibitem before it is sent to the zbMATH Citation Matcher. This way we try to increase the zbMATH hit rate.
  - make\_bib: DOIs added. If the MathSciNet match does not contain any DOI, the original entry is sent to the Crossref API.
- Version 1.3
  - make\_bib: Exit immediately if two \bibitem's have the same label (modulo capitalization).