

# Finding Information

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5. What's been done in Kay theory recently.
6. A copy of Jamie's recent paper in *Unaffordable J. Math.*
7. A copy of Lermontov's 1934 paper (in Ukrainian).

Make a note of your ideas... we'll return to them.



# Web searches (or: how to use Google better)

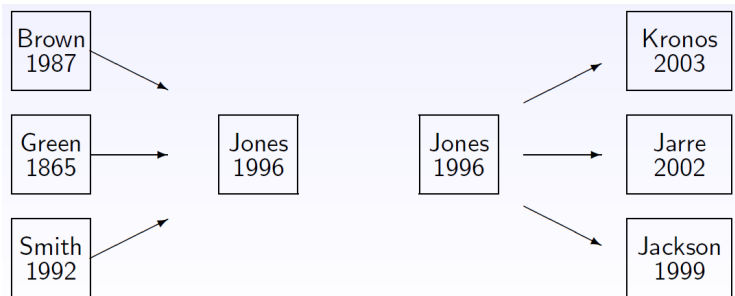
Search engines are not built to serve you.

Search tips:

- ▶ Search / skim / refine.
- ▶ Use quotes to search for exact phrases: "doe snot".
- ▶ Use - to exclude a term: strathclyde -university.
- ▶ Use OR to combine searches: salt OR sauce.
- ▶ Specify filetype: solutions filetype:pdf.
- ▶ Specify site: "launch codes" site:cia.gov.
- ▶ Use specific tools, e.g. image search or book search.
- ▶ Try searching in private mode.

# The structure of scientific literature

Scientific papers form a directed graph.



Use this structure to trace ideas, both forwards and back. But beware: citations are not just about the flow of information.

# Why do we cite work?

Some (overlapping) reasons:

- ▶ to provide intellectual **context** for our work;
- ▶ to ensure our claims can be **verified**;
- ▶ to give **credit** for previous work;
- ▶ to indicate membership of or support for a research **community**;
- ▶ to return **favours** or create a sense of obligation.

# How and when should we cite?

Some occasions when you definitely need to cite:

- ▶ direct **quotation** or close **paraphrase** of words or data;
- ▶ use of previously established **results**;
- ▶ **statements** that aren't demonstrated within your paper.

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Some bad reasons for citing:

- ▶ to make your work look “academic”;
- ▶ to increase someone's Google Scholar score.

Do read every reference you cite, and check your references.

Do give full details so people can locate your references.

Don't rely on secondary sources.

Don't copy other people's citations!

# Publication databases

Databases of publications with citations:

- ▶ Google Scholar (free; wide coverage but very random).
- ▶ Web of Knowledge, Scopus (subscription-only; narrower; also include abstracts).
- ▶ PubMed (biomed-focused; some citation info).

Treat publication metrics (h-index, impact factor etc.) with caution.

Databases of reviews:

- ▶ Mathematical Reviews (AMS): [mathscinet.ams.org](http://mathscinet.ams.org), subscription required.
- ▶ zbMATH: [zbmath.org](http://zbmath.org), free to access.

UK PhD theses: [ethos.bl.uk](http://ethos.bl.uk).

# Repositories

Where might a paper or preprint be online?

- ▶ The arXiv ([arxiv.org](http://arxiv.org)) or equivalent (e.g., [bioRxiv](http://bioRxiv)).
- ▶ An institutional repository (increasingly common).
- ▶ An author's personal website (increasingly rare).
- ▶ JStor (mostly paywalled; mostly older papers).
- ▶ Publishers' websites (mostly paywalled).
- ▶ 'Academic networking' sites (ResearchGate; Academia.edu).
- ▶ Bad places I'm not telling you about.

Respect copyright, especially when using University IT systems.

## Other useful online resources

Some classic reference works are now online, e.g. the NIST Digital Library of Mathematical Functions ([dlmf.nist.gov](http://dlmf.nist.gov)).

Other useful sites:

- ▶ MathWorld (quite comprehensive; hosted by Wolfram).
- ▶ Wikipedia (as a starting point only!)

Finally: look out for good survey and review papers in your field.



# Communities and social media

Online communities:

- ▶ StackOverflow and MathOverflow: moderated Q&A websites.
- ▶ Quora: general Q&A site (registration required).
- ▶ Reddit: (very) general message-board site.
- ▶ Twitter: see later today!

People's experience of all these sites differs widely. If you use them, try to make them better places to be.

# Library resources

Don't underestimate your library and librarians, but do respect that they have limited resources.

Your library may offer:

- ▶ classic shelves of books / journals arranged by subject;
- ▶ subscriptions to journals and e-books;
- ▶ electronic resources e.g. specialised databases;
- ▶ finding guides;
- ▶ stacks (i.e. items held but not on display);
- ▶ inter-library loans and/or reciprocal access.

Learn to use the catalogue. This might not be easy!

# Organising information

A typical thesis cites 100–200 references. You'll read more.

- ▶ Get a system for citing them consistently (e.g. BibTeX).
- ▶ Get a system for storing and finding them.

Citation management systems: Mendeley; Zotero; EndNote.

Keep full information on each reference:

- ▶ Bibliographical info (incl. full names of journals).
- ▶ Digital object identifiers (DOIs) not just URLs.

Redundant information is good!

# Organising information

Name your files consistently!

- ▶ Good: `DalyJohnson13_poincare.pdf`
- ▶ Bad: `dj13.pdf`
- ▶ Ugly: `9308809879GF6987.pdf`
- ▶ Don't. Just don't: `paper.pdf`

This also applies to files you create:

`thesis_yr3_revised_final_revised_FINAL_todo_v2.pdf`

# Summary

There are lots of ways to find mathematical information.

Most successful searches include a combination of

- ▶ careful search design;
- ▶ lateral thinking and multiple tools;
- ▶ being ready to recognise your good luck.

Your library, your supervisor and your peers probably have complementary expertise.

Start collecting and organising information now, not when you're "writing up". You will need a system that you can still navigate in 3 years!

**Now: what have I missed out?**