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Introduction to Scientific Working

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Outline

1. **TikZ**
2. **Journals**
3. **LaTeX**
4. **DOI and ORCID**
5. **Homework**

Keywords

acknowledgement · awards · beamer · bibliography · CORE ranking · DBLP · conference · editorial board · generative AI · Google Scholar · h–index · impact factor · journal · LaTeX · LIPIcs · LNCS · open access · plagiarism · presentation · program committee · rebuttal · review · submission · TikZ · workshop · ···

Types of Scientific Works

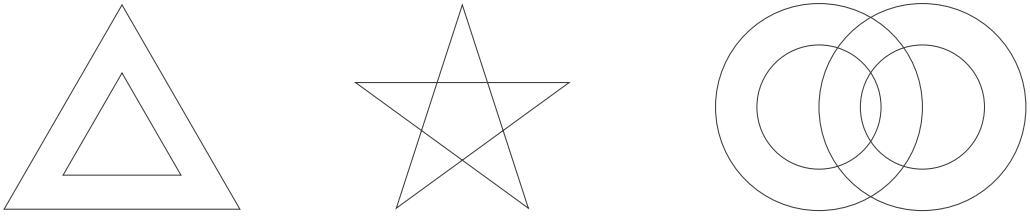
- seminar report
- bachelor thesis
- master thesis
- PhD thesis
- habilitation thesis
- workshop paper
- conference paper
- journal article
- book chapter
- book

Outline

Paths and Filling

```
\usetikzlibrary{scopes}
\draw (90:2) -- (210:2) -- (330:2) -- cycle
      (90:1) -- (330:1) -- (210:1) -- cycle;
{ [shift={(5cm,3.5mm)}, scale=1.65]
  \draw (90:1) -- (234:1) -- (18:1) -- (162:1) -- (306:1) -- cycle; }
{ [shift={(11cm,5mm)}, scale=0.76]
  \draw (-1,0) circle (1.2) (-1,0) circle (2);
  \draw (1,0)  circle (1.2)  (1,0) circle (2); }
```

src



Path Interior: Nonzero Rule

to determine whether point is outside or inside:

- consider ray from point toward infinity in any direction
- set counter to zero
- each time ray crosses path
  - increment counter if path goes from left to right
  - decrement counter if path goes from right to left
- point is outside (inside) if counter is zero (nonzero)

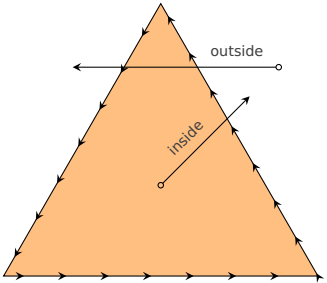
Path Interior: Even Odd Rule

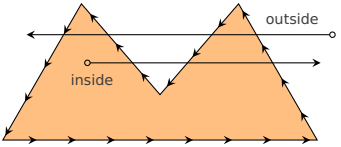
to determine whether point is outside or inside:

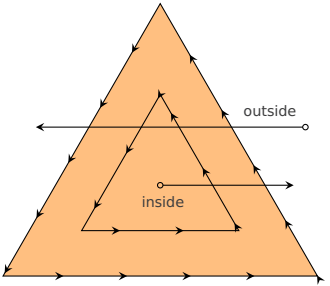
- count how often ray crosses path
- point is outside (inside) if count is even (odd)

```
\filldraw[orange!50] (90:2) -- (210:2) -- (330:2) -- cycle;
\filldraw[orange!50] (150:1) -- (210:2)  -- (330:2)
                  -- (30:1) -- (0,-0.5) -- cycle;
\filldraw[orange!50] (90:2) -- (210:2) -- (330:2) -- cycle
                    (90:1) -- (210:1) -- (330:1) -- cycle;
```

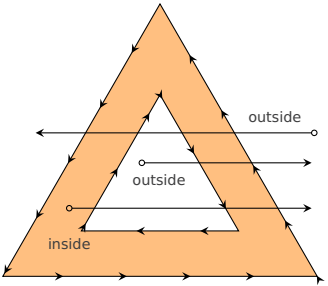
src





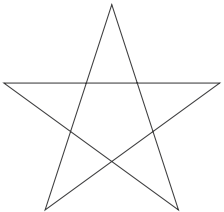


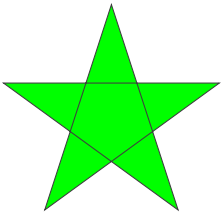
```
\filldraw[orange!50] (90:2) -- (210:2) -- (330:2) -- cycle
                     (90:1) -- (330:1) -- (210:1) -- cycle;
```

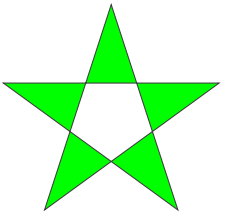


```
\draw                (90:1) -- (234:1) -- (18:1) -- (162:1) -- (306:1) -- cycle;
\draw[fill=green]    (90:1) -- (234:1) -- (18:1) -- (162:1) -- (306:1) -- cycle;
\draw[fill=green, even odd rule]
                     (90:1) -- (234:1) -- (18:1) -- (162:1) -- (306:1) -- cycle;
```

src







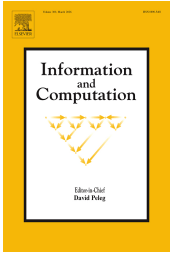
Outline

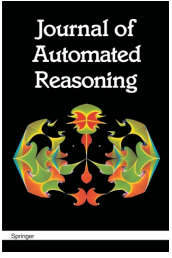
- editorial board
- deadlines
- reviewing process
- publication
- impact factor
- open access

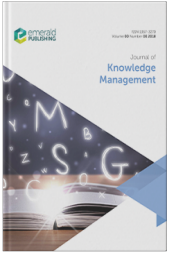
Some Computer Science Journals

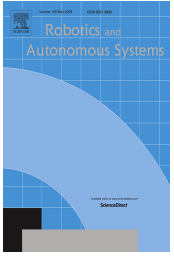
CACM CSUR FGCS JACM I&C IOTJ IPL JAIR JAR JFP JKM

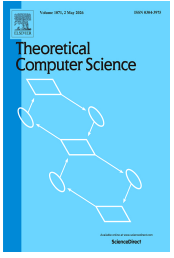
JMLR JSC LMCS NMI RAS TCS TOCL TODS TPLP · · ·











Impact Factor

- bibliometric metric measuring average number of citations to recent articles
- indicator of journal's prestige and impact
- calculated annually by Clarivate

Clarivate

$$\text{IF}(2025) = \frac{\text{citations in 2025 for articles published in 2024 and 2023}}{\text{number of articles published in 2024 and 2023}}$$

- examples: Nature 48.5 Science 45.8 CACM 12.2 TCS 1.0

Open Access

- green OA
  - self–archiving by authors is permitted
- gold OA
  - publisher makes all articles and related content available for free
  - articles are licensed for sharing and reuse via Creative Commons licenses or similar
  - article processing charge (APC) typically paid through institutional or project funding
- diamond OA
  - gold OA without APC
- hybrid OA

Outline

- matrices

```
\begin{bmatrix}
a & b & c & d \\
e & \hdotsfor{3} \\
i & j & k & l
\end{bmatrix}
```

$$\begin{bmatrix} a & b & c & d \\ e & & \dots & \\ i & j & k & l \end{bmatrix}$$

- `Bmatrix` `vmatrix` `Vmatrix` produce different delimiters $\{\}$ $||$ $\|\|$
- `smallmatrix` environment for use in text $\left(\begin{smallmatrix} a & b \\ c & d \end{smallmatrix}\right)$

▸ spacing and dots

abbreviation	command	example
	(no space)	[]
\,	\thinspace	[ ]
\:	\medspace	[ ]
\;	\thickspace	[ ]
	\quad	[ ]
	\qquad	[ ]
\!	\negthinspace	[]
	\negmedspace	[]
	\negthickspace	[]

command	description
\dotsc	dots with commas
\dotsb	dots with binary operators/relations
\dotsm	multiplication dots
\dotsi	dots with integrals
\dotso	other dots

```
Consider the series $A_1, A_2, \dotsc$, the sum $A_1 + A_2 + \dotsb$,
the product $A_1 A_2 \dotsm$, and the infinite integral
\[
\int_{A_1} \int_{A_2} \dotsi
\]
```

src

Consider the series $A_1, A_2, \dots$, the sum $A_1 + A_2 + \cdots$, the product $A_1 A_2 \cdots$, and the infinite integral

$$\int_{A_1} \int_{A_2} \dots$$

- extensible arrows and friends

```
A \xleftarrow{n+\mu-1} B \xrightarrow[\gamma]{n^2+i-1} C

\overset{*}{X} \quad \underset{\alpha}{Y} \quad \overunderset{*}{\alpha}{Z}

\sqrt{x}+\sqrt{y}+\sqrt{z} \neq \sqrt{x}+\sqrt{\smash[b]{y}}+\sqrt{z}
```

src

$$A \xleftarrow{n+\mu-1} B \xrightarrow[\gamma]{n^2+i-1} C \qquad \overset{*}{X} \quad \underset{\alpha}{Y} \quad \overunderset{*}{\alpha}{Z} \qquad \sqrt{x}+\sqrt{y}+\sqrt{z} \neq \sqrt{x}+\sqrt{\smash[b]{y}}+\sqrt{z}$$

delimiters

\left \right	\bigl \bigr	\Bigl \Bigr	\biggl \biggr	\Biggl \Biggr
$(a)(\frac{b}{c})$	$(a)\left(\frac{b}{c}\right)$	$(a)(\frac{b}{c})$	$\left(a\right)\left(\frac{b}{c}\right)$	$\left(a\right)\left(\frac{b}{c}\right)$	$\left(a\right)\left(\frac{b}{c}\right)$

```
\left[\sum_i a_i\left\lvert\sum_j x_{ij}\right\rvert^p\right]^{1/p}
\qquad\text{versus}\qquad
\biggl[\sum_i a_i\Bigl\lvert\sum_j x_{ij}\Bigr\rvert^p\biggr]^{1/p}
```

src

$$\left[\sum_i a_i\left\lvert\sum_j x_{ij}\right\rvert^p\right]^{1/p} \qquad\text{versus}\qquad \biggl[\sum_i a_i\Bigl\lvert\sum_j x_{ij}\Bigr\rvert^p\biggr]^{1/p}$$

```
@article{EWZ08,
  author  = "J{\"o}rg Endrullis and Johannes Waldmann and Hans Zantema",
  title   = "Matrix Interpretations for Proving Termination of Rewrite Systems",
  journal = "Journal of Automated Reasoning",
  volume  = 40,
  number  = "2-3",
  pages   = "195--220",
  year    = 2008,
  doi     = "10.1007/s10817-007-9087-9"
}
```

- required fields: `author` `title` `journal` `year`
- optional fields: `volume` `number` `pages` `month` `note`

```
@phdthesis{B65,
  author    = "Bruno Buchberger",
  title     = "Ein {A}lgorithmus zum {A}uffinden der {B}asiselemente des
               {R}estklassenringes nach einem nulldimensionalen {P}olynomideal",
  school    = "Universit{\"a}t Innsbruck",
  year      = 1965
}
```

- required fields: `author` `title` `school` `year`
- optional fields: `type` `address` `month` `note`

```
@techreport{MS91,
  author      = "Aart Middeldorp and Mirna Star\v{c}evi\'{c}",
  title       = "A Rewrite Approach to Polynomial Ideal Theory",
  number      = "CS-R9160",
  institution = "CWI, Amsterdam",
  year        = 1991
}
```

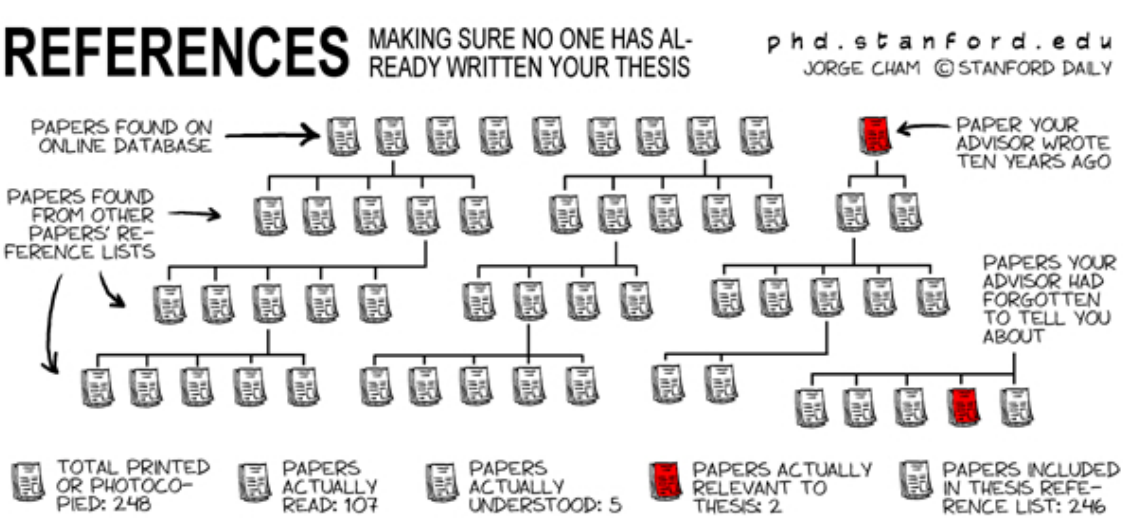
- required fields: `author` `title` `institution` `year`
- optional fields: `type` `number` `address` `month` `note`

```
@misc{TATA,
  author = "Hubert Comon and Max Dauchet and R{\'e}mi Gilleron and
            Christof L{\"o}ding and Florent Jacquemard and Denis Lugiez and
            Sophie Tison and Marc Tommasi",
  title  = "Tree Automata Techniques and Applications",
  url    = "http://tata.gforge.inria.fr/",
  year   = 2008
}
```

- required fields:
- optional fields: `author` `title` `howpublished` `month` `year` `note`

```
@misc{Haskell,
  title        = "Haskell",
  howpublished = "\url{https://www.haskell.org/}",
  note         = "Accessed: 2026-04-02"
}
```

latex src bib file


REFERENCES
MAKING SURE NO ONE HAS ALREADY WRITTEN YOUR THESIS
phd.stanford.edu
JORGE CHAM ©STANFORD DAILY
PAPERS FOUND ON ONLINE DATABASE
PAPER YOUR ADVISOR WROTE TEN YEARS AGO
PAPERS FOUND FROM OTHER PAPERS' REFERENCE LISTS
PAPERS YOUR ADVISOR HAD FORGOTTEN TO TELL YOU ABOUT
TOTAL PRINTED OR PHOTOCOPIED: 248
PAPERS ACTUALLY READ: 107
PAPERS ACTUALLY UNDERSTOOD: 5
PAPERS ACTUALLY RELEVANT TO THESIS: 2
PAPERS INCLUDED IN THESIS REFERENCE LIST: 246

Outline

Digital Object Identifier

- DOI is digital identifier of object to keep track of it
- `https://doi.org/`*doi*
- papers 10.46298/lmcs-21(2:29)2025
- projects 10.55776/I5943
- artifacts 10.5281/zenodo.13969852

Open Researcher and Contributor ID

- ORCID is unique persistent identifier for researchers 0000-0001-7366-8464
- ORCID record connects researchers with activities
  - employment affiliations
  - research outputs
  - funding
  - . . .

Outline

Homework Exercises for May 7

1. Reproduce the DOI and ORCID logos shown on slide 27 using TikZ. (1)
2. Determine the 2024 or 2025 impact factors as well as the access models of the journals whose acronyms are given on slide 12. (1)
3. Typeset the following symbols in LaTeX: (1)

4. What is CiteScore? How does it compare to IF? (1)
5. Summarize the criticism raised at the OA model of the ACM Digital Library. (1)