zbmath.org

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zbMATH
the first resource for mathematics

# zbMATH
# Training Guide

Fall 2012

# Agenda

- Introduction
- Facts on zbMATH
- Usage / mirror servers
- Advantages of zbMATH
- Statistics
- Getting started
- Site Guide

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## Why an Abstracting and Indexing Service in Mathematics?

- To provide comprehensive information on all available mathematical literature
- To provide a unique navigation tool for accessing mathematical publications
- To provide a data-mining tool for detecting trends in mathematical research, historical and contemporary
- To describe the mutual impact of mathematical publications
- To provide a large infrastructure for mathematical research and applications of mathematics

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# What is zbMATH

- The **world's largest database for mathematics** offers **complete and easy access** to reviews and abstracts in mathematics **from 1868** to the present.
- Contains **more than 3 million entries** drawn from more than **3,500 journals, 1,100 serials** and about **170,000 books**, with coverage across mathematics, statistics, computer sciences and applications of these disciplines to engineering, physics, economics, life sciences and more.
- Reviews are written by **more than 6,500 active experts** from all over the world and **over 120,000 new items are added each year**.
- Contains about **35,000 reviews** in total. 50% of the items in core mathematic disciplines are covered by reviews.
- **All entries go through a review process** and are specified by the appropriate MSC code (Mathematics Subject Classification) and keywords.
- Includes more than 4 million references.

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# zbMATH - the whole world of mathematics and its applications

- Logic and foundations
- Algebra
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- Probability and statistics
- Combinatorics
- Mathematical aspects of computer science
- Numerical analysis and scientific computing
- Control theory and optimization
- Mathematics in science and technology
- Mathematics education and popularization of mathematics
- History of mathematics

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# zbMATH: CONTENT

- Number of entries/items: More than 3 million; 120,000 added per year; daily uploads
- Quality of items: All items since 1970 indexed with an MSC code (Mathematics Subject Classification) – more than 2.6 million items MSC-categorized; nearly all items categorized with keywords; only about 3% are not categorized ("title-only") as they are recent input
- All items go through a review process
- Journals covered: about 3,500
- Series covered: about 1,100
- Books covered: about 170,000
- Coverage: starting in 1826, complete coverage as of 1868
  High relevancy of "old" publications: e.g. between 2000 and 2009 more than 1,200 papers were cited which were published 1880-1889
- More than 4 million references

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# zbMATH: USABILITY

- Search Options: Free logical combination of facets possible; option of refining / enlarging search results; search history, several additional search options (language, publisher, keywords, ISBN, DOI)
- Author Search: Any order of first / surname and abbreviations works; multiple author search possible
- Repositories: Direct link to arXiv.org and other open access repositories like ElibM, Numdam, Euclid etc.
- Formulas: Quick, accurate and complete display, even for complex formulas and equations, facilitated by MathML, which is preinstalled

# Who stands behind zbMATH?

- Editor-in-Chief as of 2012:
  Gert-Martin Greuel, the director of the world-famous Mathematical Research Centre, Oberwolfach. Professor at the University of Kaiserslautern, and Chair of ERCOM (European Research Centres on Mathematics)

- Edited by:
  - FIZ Karlsruhe, Leibniz Institute for Information Infrastructure
  - EMS (European Mathematical Society)
  - Heidelberg Academy of Sciences and Humanities
- Published by Springer

FIZ Karlsruhe
Leibniz Institute for Information Infrastructure

European Mathematical Society

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# Which kind of organizations use zbMATH?

- All universities, academies, colleges with a strong branch in mathematics or aligned disciplines
- All non-university research organizations /institutes/centers focusing on mathematics, physics, computing, energy, telecommunication, geography, astronomy etc. naming big ones like CERN, the European Organization for Nuclear Research, Geneva and CSIRO, the Commonwealth Scientific and Industrial Research Organization, Australia
- Governmental institutions: defense, economics, energy
- National libraries
- Chemical corporate libraries

- Potential customers: all subscribers to Springer's journal and ebook collection in mathematics

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# Mirror servers around the world

- Cornell University, Ithaca, NY, USA
- Hellenic Mathematical Society, Athens, Greece
- Institute de Recherche Mathématique Avancée (IRMA), Strasbourg, France
- Russian Academy of Sciences (RAS), Moscow, Russia
- Serbian Academy of Arts and Sciences, Mathematical Institutes, Belgrade, Serbia
- The Mathematical Sciences Research Institute (MSRI), Berkeley, CA, USA
- Tsinghua University, Beijing, China
- University of Alberta, Edmonton, Canada
- University of Warsaw, Interdisciplinary Centre for Mathematical & Computational Modeling (ICM), Warsaw, Poland

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# Advantages of zbMATH (1)

- **Complete coverage** of all mathematical publications **as of 1868** (some even back to 1826) including more than **3,500 journals, 1,100 s**erials and about **170,000 books**
- **Quick upload** of items after publication
- **Very detailed coding** of items: all items go through review process; all items published since 1970 categorized with MSC code; additionally with keywords
- All items of **mathematical relevance**
- **Detailed search**: Free logical combination of 6 facets possible offering even specific searches for source, language of publication, keywords, publisher, ISBN, DOI
- **Search history** and the possibility of **refining/enlarging the search**
- Author search: **no strict rules for search input**

# Advantages of zbMATH (2)

- **Results ordered chronologically** so you can easily jump to the first publication on a specific topic
- A **quick, accurate and complete display of even complex formulas** and equations guaranteed by the integration of MathML (Mathematical Markup Language).
- **Links to open repositories** like arXiv.org
- **Interface language**: zbMATH also offers Chinese, Japanese, Russian, Spanish – besides English, German, French
- **Mirror sites**: 9 locations:
  2 USA, 1 Canada, 1 France, 1 Greece, 1 Poland, 1 Serbia, 1 Russia, 1 China

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# Why librarians would subscribe to zbMATH

To be sure to offer:

- The world's largest and most complete reviewing service in mathematics containing all abstracts and reviews in mathematics from 1868 – in some cases even from 1826 – to the present.
- More than 3 million entries; items uploaded daily.
- A broad coverage of mathematical books which are also uploaded quickly after publication.
- A unique Search: Free logical combination of facets possible offering even specific searches e.g. for source, language of publication, keywords, publisher, ISBN, DOI.
- An easy check for access to the full text via OpenURL/SFX.
- A quick, accurate and complete display of even complex formulas and equations guaranteed by the integration of MathML (Mathematical Markup Language).

# Statistics

- Counter-like statistics are freely available on request at any time. Statistics are automatically provided once a year.

# Getting started

**Enter zbMATH at**: www.zbmath.org

Depending on the browser, the URL will guide you to the newest interface possible

**Browsers**

Highly recommended to install the free MathPlayer plug-in to be able to enter the **newest database version** including the newest **author database** and guaranteeing a **correct display of mathematical formulas and equations**

- Recommended browser: Mozilla Firefox
- Internet Explorer from 8.0 partially possible via MathPlayer plug-in, without plug-in probably possible from 10.0
- Opera (as of 9.5), Safari (as of 5.1), SeaMonkey, Iceweasel, Netscape, Chrome (most likely as of 20.0)

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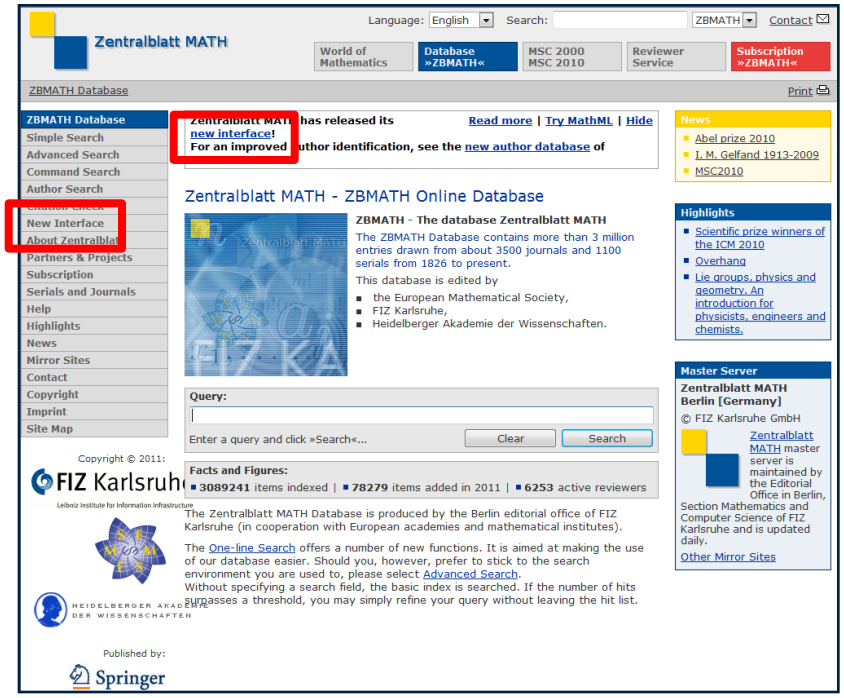
# Take a look at zbmath.org or see the following screenshots

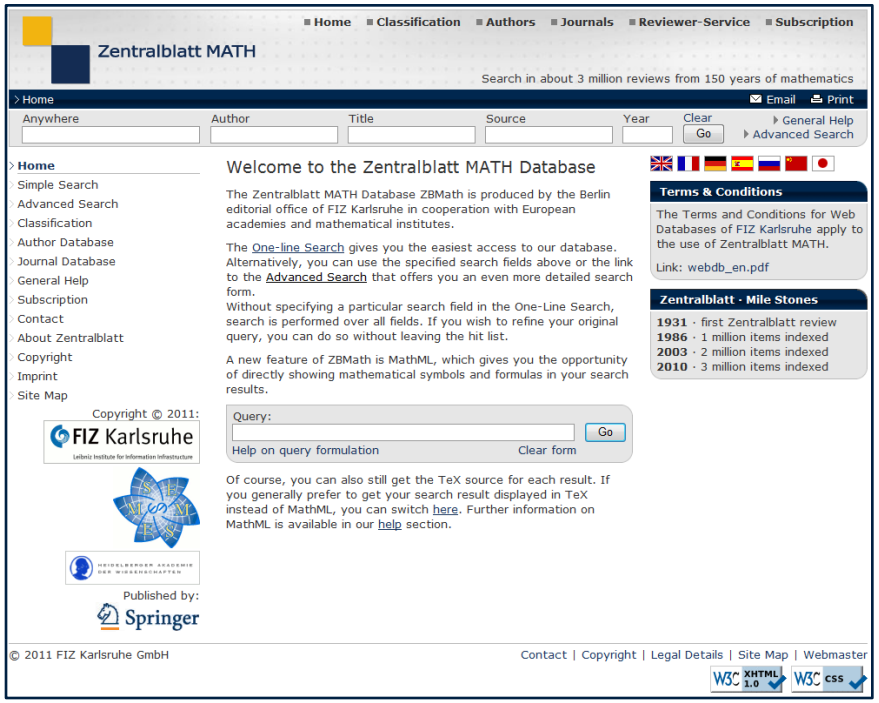
- Be aware of changes to the zbMATH website – re-design is scheduled to be live beginning of 2013
- Goal: all browsers direct to a newly designed interface

# Be aware of the Interface Versions www.zbmath.org

Depending on the browser, the URL will guide you to the newest interface possible.

- Older: zentralblatt-math.org/zmath/
- Newer: zentralblatt-math.org/zbmath/

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## Welcome to the Zentralblatt MATH Database

The Zentralblatt MATH Database ZBMath is produced by the Berlin editorial office of FIZ Karlsruhe in cooperation with European academies and mathematical institutes.

The One-line Search gives you the easiest access to our database. Alternatively, you can use the specified search fields above or the link to the Advanced Search that offers you an even more detailed search form.
Without specifying a particular search field in the One-Line Search, search is performed over all fields. If you wish to refine your original query, you can do so without leaving the hit list.

A new feature of ZBMath is MathML, which gives you the opportunity of directly showing mathematical symbols and formulas in your search results.

Query: Go
Help on query formulation · Clear form

Of course, you can also still get the TeX source for each result. If you generally prefer to get your search result displayed in TeX instead of MathML, you can switch here. Further information on MathML is available in our help section.

**Terms & Conditions**

The Terms and Conditions for Web Databases of FIZ Karlsruhe apply to the use of Zentralblatt MATH.

Link: webdb_en.pdf

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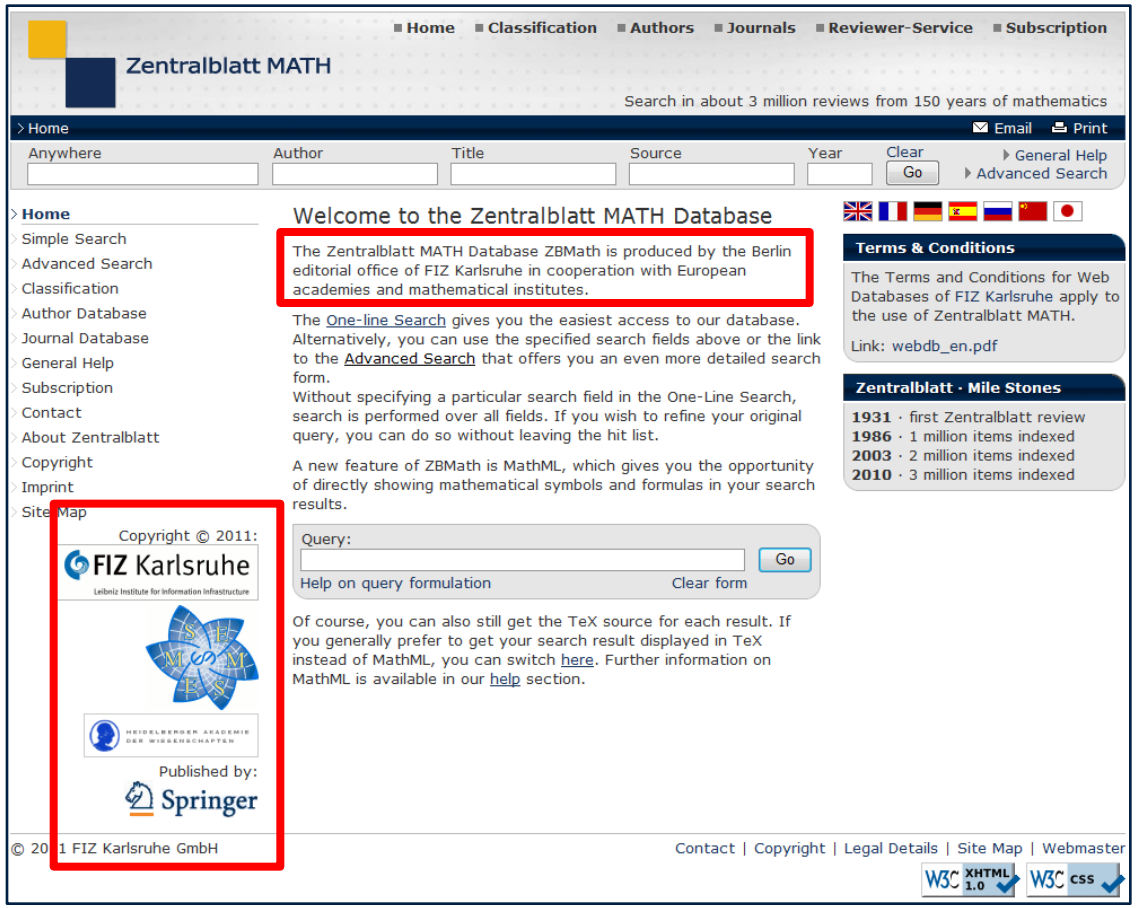
**1986** · 1 million items indexed
**2003** · 2 million items indexed
**2010** · 3 million items indexed

Top and left side navigation

# Parties involved in zbMATH:

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- Heidelberg Academy of Science
- FIZ Karlsruhe

Editor-in-Chief:

Gert-Martin Greuel

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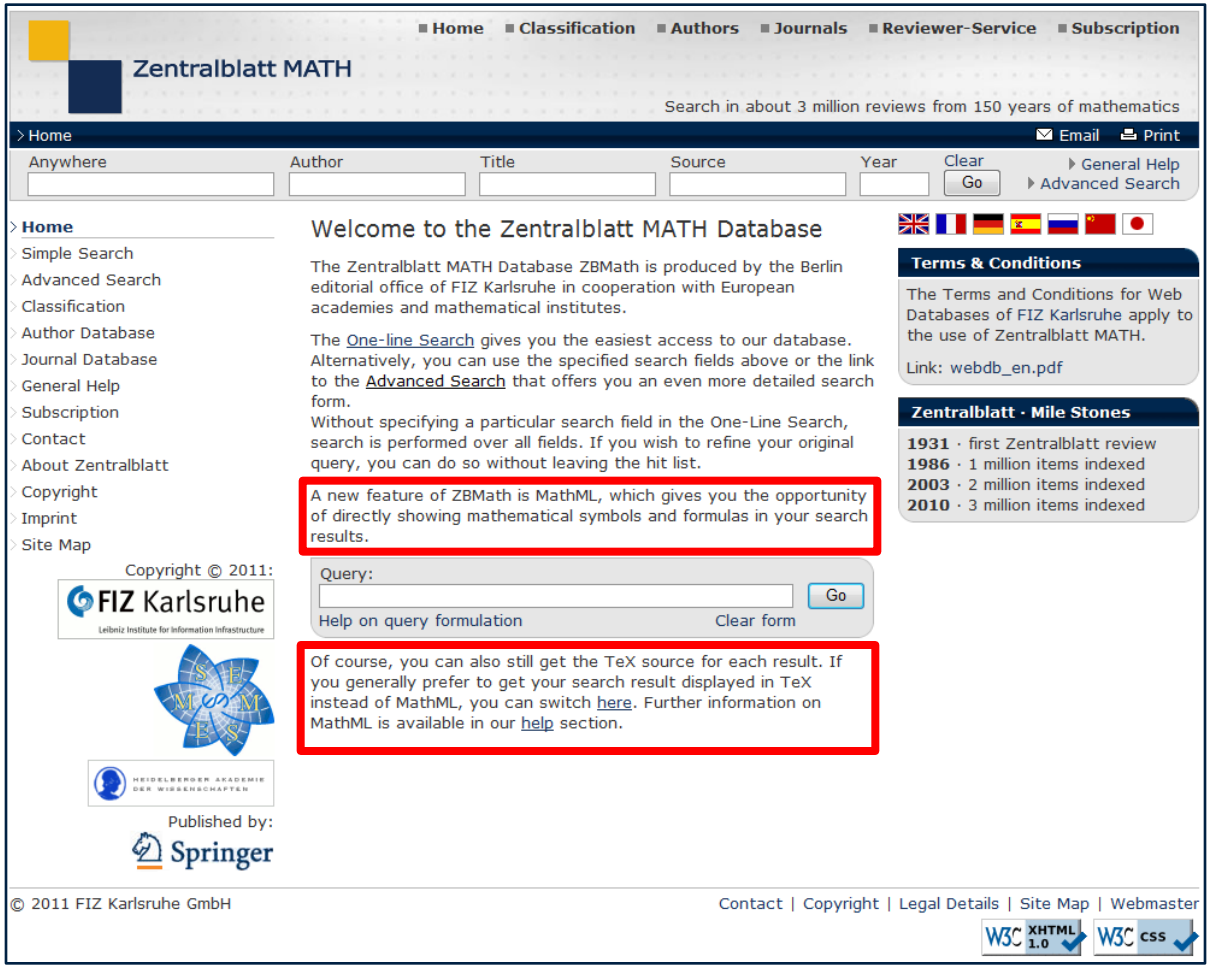
# Display of Formula Use of MathML or TeX




Integrated MathML (Mathematics Markup Language) enables immediate display of complex equations and formulas.

If display in TeX is preferred, it's possible too.

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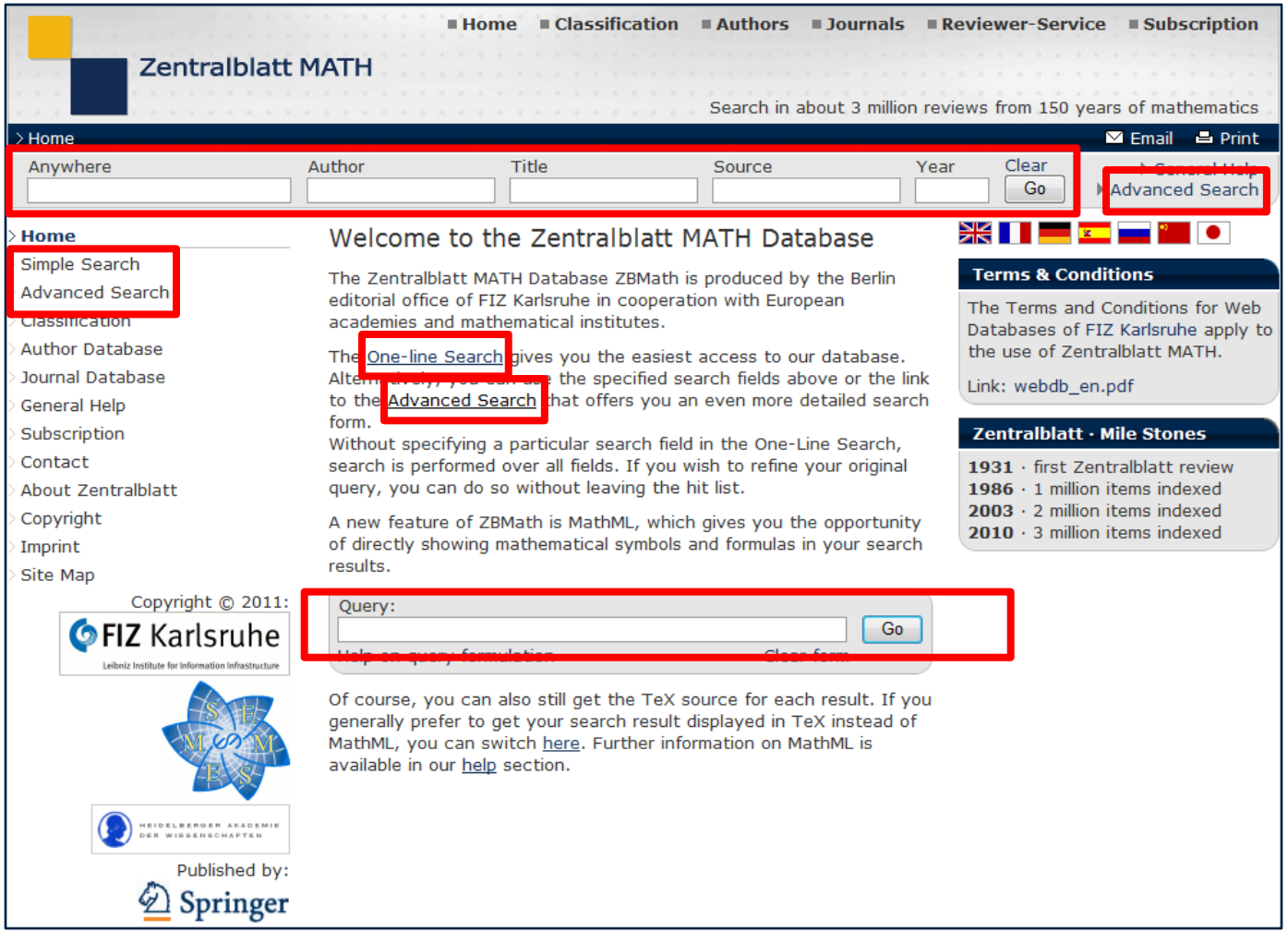
# Search options:
# Search Fields / Advanced Search / One-line Query




Search Fields

Advanced Search links to an interface with even more search categories and Boolean Operations

One-Line Query

Simple Search: either search with Search Fields or One-Line Search

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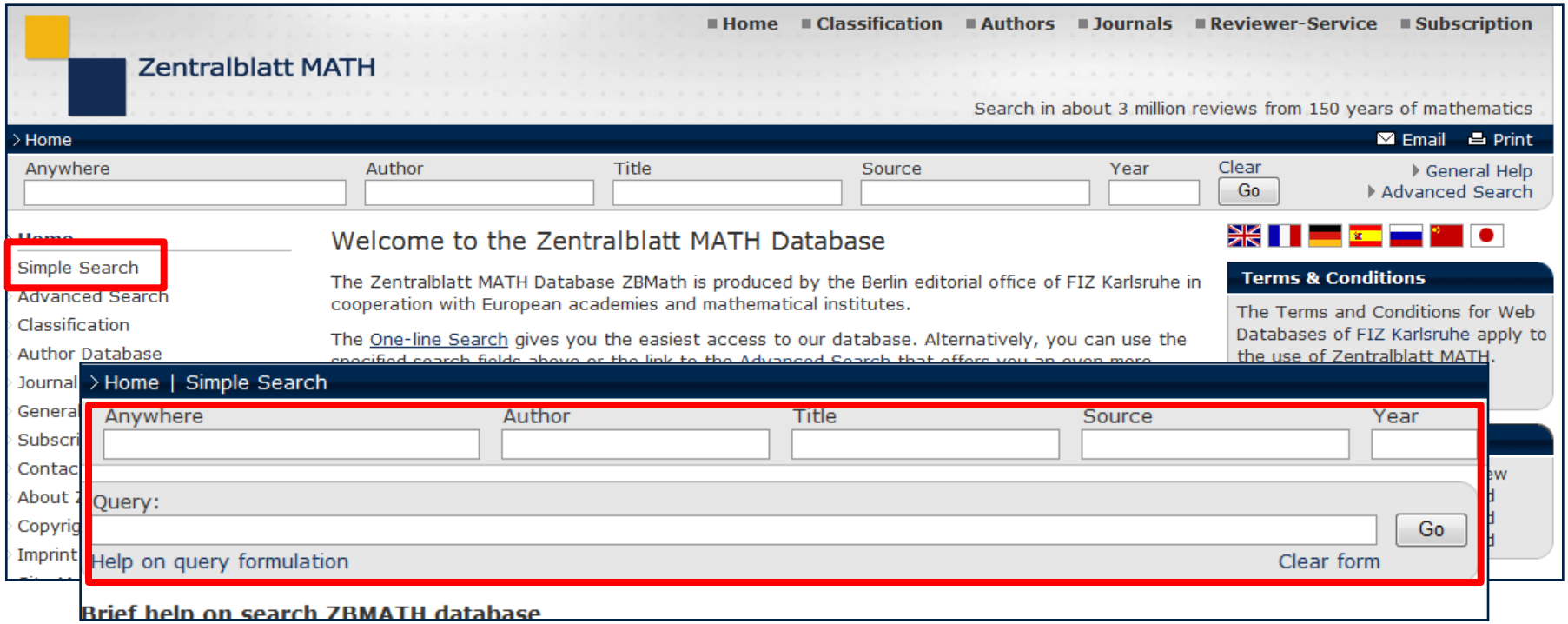
# Simple Search: Search Fields or One-Line Search




Search Fields or the One-Line Search could be used right from the homepage or via "Simple Search."
The One-Line Query is a "google-like search."

You'll find guidelines on how to search below.

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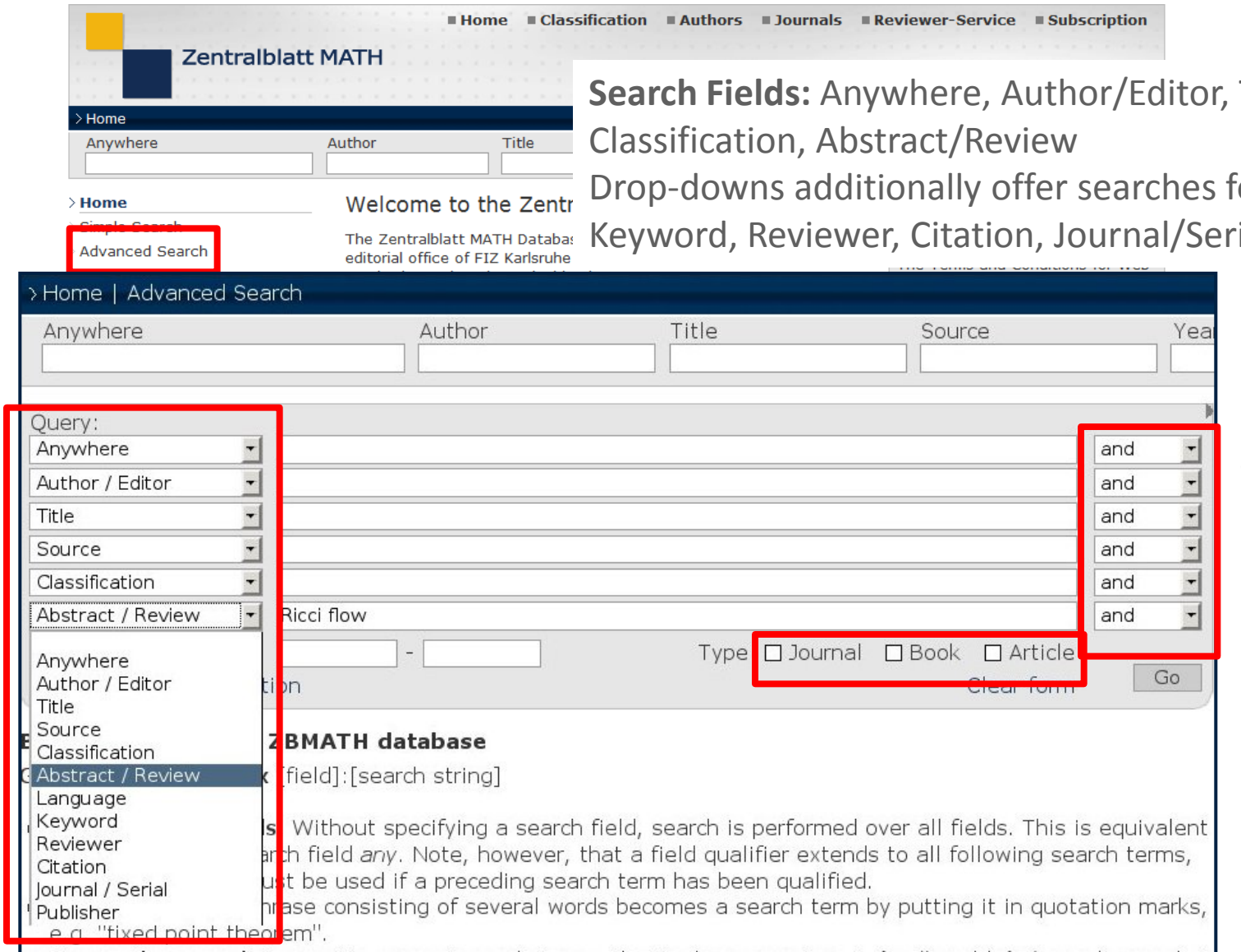
# **Advanced Search:** more search fields / boolean operations




**Search Fields:** Anywhere, Author/Editor, Title, Source, Classification, Abstract/Review
Drop-downs additionally offer searches for Language, Keyword, Reviewer, Citation, Journal/Serial, Publisher

**Boolean Operations**: and / or / not

**Type**: Journal / Book / Article

# Brief Help on Search

Go

Help on query formulation Clear form

**Brief help on search ZBMATH database**

**General search syntax** [field]:[search string]

- **Default search fields:** Without specifying a search field, search is performed over all fields. This is equivalent to specifying the search field *any*. Note, however, that a field qualifier extends to all following search terms, and therefore *any* must be used if a preceding search term has been qualified.
- **Phrase search:** A phrase consisting of several words becomes a search term by putting it in quotation marks, e.g. "fixed point theorem".
- **Connecting search terms:** To connect search terms, the Boolean operators & *(and)* and | *(or)* may be used. A search for terms connected with & will give all documents containing all these terms, while using | will give all documents containing any of these terms. The operator ^ *(not)* can also be used.
- **Connection default is &:** If the search string contains several words separated by blanks but not put in quotation marks, the query will give all documents containing *all* these words. This is therefore equivalent to connecting the words with the operator & *(and)*.
- **Abbreviating search terms:** Right truncation of search terms is possible by placing the * symbol at the end of the search term. To truncate a phrase enclosed in quotation marks, the * must be put **before** the closing quotation mark. This kind of "wildcarding" is possible only at the end (but not within) of a word or phrase; if the * symbol is found within a phrase, it has no effect.

**Examples**

| | | |
|---|---|---|
| "einstein manifold" | ti:"cauchy process*" | cc:05C55 |
| "einstein manifold*" | any:eigenvalue* | cc:*05C55 |
| einstein manifold* | au:hirzebruch,f* | an:1089.11026 |
| einstein & manifold* | la:russian | an:05654321 |
| einstein \| manifold* | rv:dieudonne | |
| au:einstein, a* & any:manifold* | | |

**Search fields**

| Field | Description |
|---|---|
| any | Joint index of all fields. |
| au | Authors, editors, and author references. |
| ti | Original and translated titles. |
| so | Source data, including journal or serial title, volume and issue number, pagination, publisher, and publication year. |
| cc | Mathematics Subject Classification (MSC 2010).<br>The symbol * in front of an MSC code means primary classification. |
| ut | Keywords (Uncontrolled terms not from a controlled vocabulary). |
| py | Publication year(s). |
| la | Languages and ISO 639-1 alpha-2 language codes. |
| dt | Document types: (j, b, a)<br>j → journal article; b → book; a → book article |
| an | Zentralblatt MATH identifier and document (DE) number. |
| rv | Reviewers. |

Help on Simple and Advanced Search sites.

Free logical combination of facets possible for refining / enlarging search results including additional search options: language, publisher, keywords, ISBN, DOI

# Search History

Query:
ricci flow
Go
Help on query formulation
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Result **1** to **20** of **691** total
Show marked Items
1 21 41 61 81 101

1 Zbl 05968481 **Hsu, Shu-Yu**
**Lower bound for the scalar curvature of the standard solution of the Ricci flow.** (English)
Int. Math. Forum 6, No. 17-20, 829-835 (2011).
MSC 2010: 58J35 53C44 58C99
PDF XML AMS-TeX TEXT BibTeX Web Link
Comment on this Item

2 Zbl 05959532 **Fillastre, François; Izmestiev, Ivan**
**Gauss images of hyperbolic cusps with convex polyhedral boundary.** (English)
Trans. Am. Math. Soc. 363, No. 10, 5481-5536 (2011).
MSC 2010: 57M50 52A55 52C26 52C25
PDF XML AMS-TeX TEXT BibTeX Full Text
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**arXiv.org Preprints**
Try this retrieval query in arXiv.org.
Search

**History**

| | | |
|---|---|---|
| 1 | ricci flow | 691 |
| 2 | inventiones ricci flow | 9 |
| 3 | inventiones ricci | 51 |
| 4 | inventiones | 3740 |

Clear

1 Zbl 1130.53003 **Perelman, Grisha**
**Finite extinction time for the solutions to the Ricci flow on certain three-manifolds.** (English)
arXiv e-print service, Cornell University Library, Paper No. 0307245, 7 p., electronic only (2003)
MSC 2010: 53-02 53C44 53C21 57M40 57R60 · Reviewer: Gérard Besson (Grenoble)
PDF XML AMS-TeX TEXT BibTeX arXiv.org
Comment on this Item

**History**

| | | |
|---|---|---|
| 1 | au:perelman grisha | 9 |
| 2 | ricci flow | 691 |
| 3 | inventiones ricci flow | 9 |
| 4 | inventiones ricci | 51 |

Visualization of the Search History facilitates modifications or refinements of searches.

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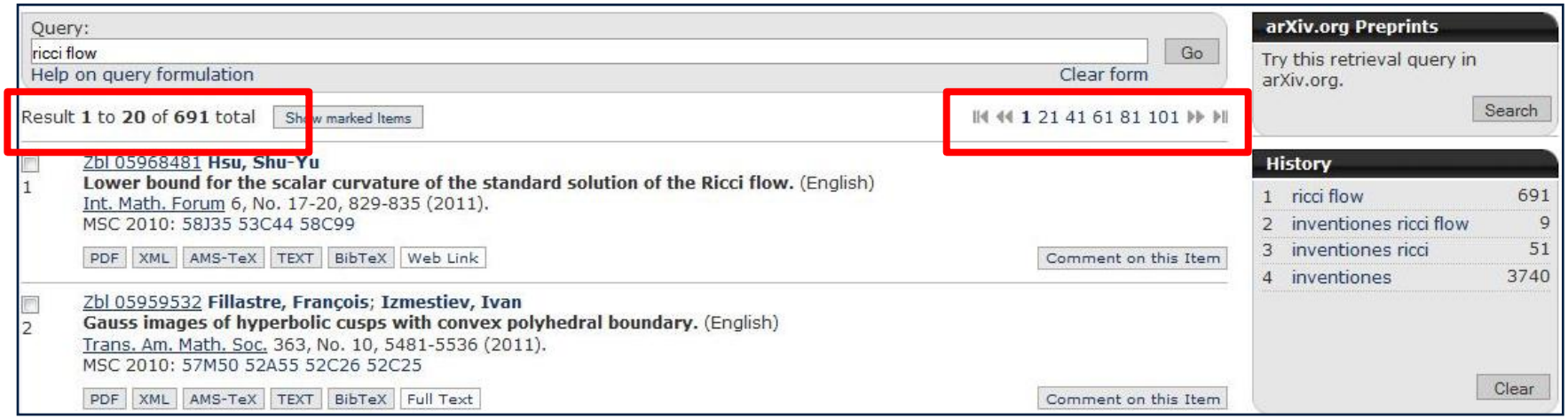
# Search Results




- Total number of results shown
- Display of results ordered chronologically from newest to oldest; the user can easily jump to older results or check the first item found by the search
- ALL text in BLUE is clickable and links to one result or further searches
- Click on a result / the Zbl number -> full review, full text
- Click on author -> all items in zbMATH by this author
- Click on journal -> all articles of this journal
- Click on MSC2010 code -> all items listed under this special code

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# Results – quick check if there is a subscription to the source to check the full text via OpenURL /SFX e.g. MPG

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Anywhere | Author | Title | Source | Year

Query: inventiones

Go

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Result 1 to 20 of 3748 total | Show marked Items | 1 21 41 61 81 101

1 [MATRIX] Zbl 1234.35318 Andersson, John; Shahgholian, Henrik; Weiss, Georg S.
On the singularities of a free boundary through Fourier expansion. (English)
Invent. Math. 187, No. 3, 535-587 (2012).
MSC 2010: 35R35 35B40 35J60
PDF | XML | AMS-TeX | TEXT | BibTeX | Full Text | Comment on this Item | MPG S·F·X

2 [MATRIX] Zbl 06021979 G\'erard, Patrick; Grellier, Sandrine
Invariant tori for the cubic Szeg\"o equation. (English)
Invent. Math. 187, No. 3, 707-754 (2012).
MSC 2010: 35B15 37K15 47B35
PDF | XML | AMS-TeX | TEXT | BibTeX | Full Text | Comment on this Item | MPG S·F·X

3 [MATRIX] Zbl 06021978 Sznitman, Alain-Sol
Decoupling inequalities and interlacement percolation on $G\times \mathbb Z$. (English)
Invent. Math. 187, No. 3, 645-706 (2012).
MSC 2010: 60Kxx
PDF | XML | AMS-TeX | TEXT | BibTeX | Full Text | Comment on this Item | MPG S·F·X

4 [MATRIX] Zbl 06021977 Pop, Florian
On the birational anabelian program initiated by Bogomolov. I. (English)
Invent. Math. 187, No. 3, 511-533 (2012).
MSC 2010: 14Hxx 12Exx 14Exx 14Jxx 12E30 14E99 14H30 14J99
PDF | XML | AMS-TeX | TEXT | BibTeX | Full Text | Comment on this Item | MPG S·F·X

5 [MATRIX] Zbl 06021976 Lin, Fanghua
Erratum: On the Dirichlet problem for minimal graphs in hyperbolic space. (English)
Invent. Math. 187, No. 3, 755-757 (2012).
MSC 2010: 35B65 35J65
PDF | XML | AMS-TeX | TEXT | BibTeX | Full Text | Comment on this Item | MPG S·F·X

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http://sfx.mpg.de/sfx_local?sid=FIZ-Karlsruhe%3AZMATH&ger

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Title: On the singularities of a free boundary through Fourie expansion.
Source: Inventiones mathematicae [0020-9910, 1432-1297] yr:2012 vol:187 iss:3 pg:535

Full Text
Full text available via SpringerLink
Year: 2012 Volume: 187 Issue: 3 Start Page: 535
Available from 1997

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Create a Short URL

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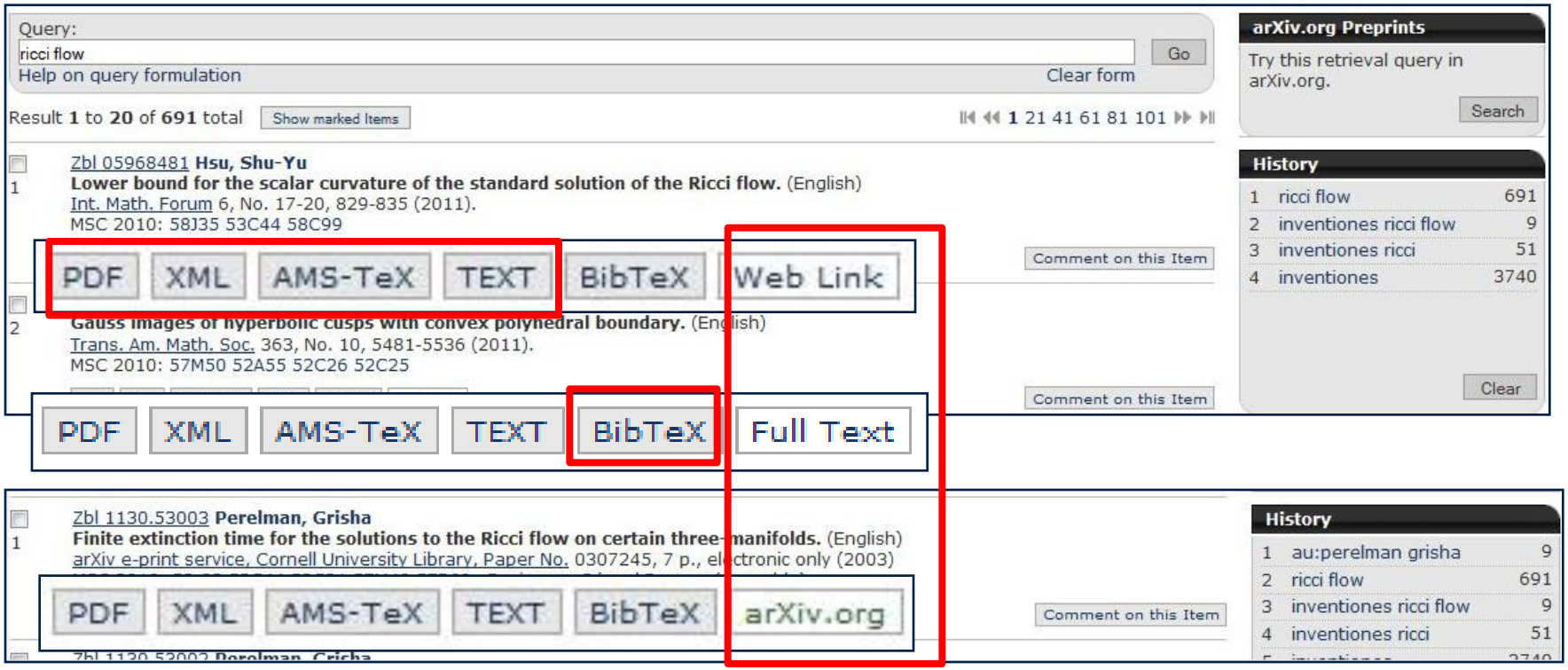


All entries link back to their original source. The source might be Full Text, a Web Link or a link to arXiv.org or other open repositories. Links to open repositories are in GREEN text.

Downloading of search results offered in different formats: PDF, XML, etc.

Download of reference in BibTeX and other formats for own reference lists.

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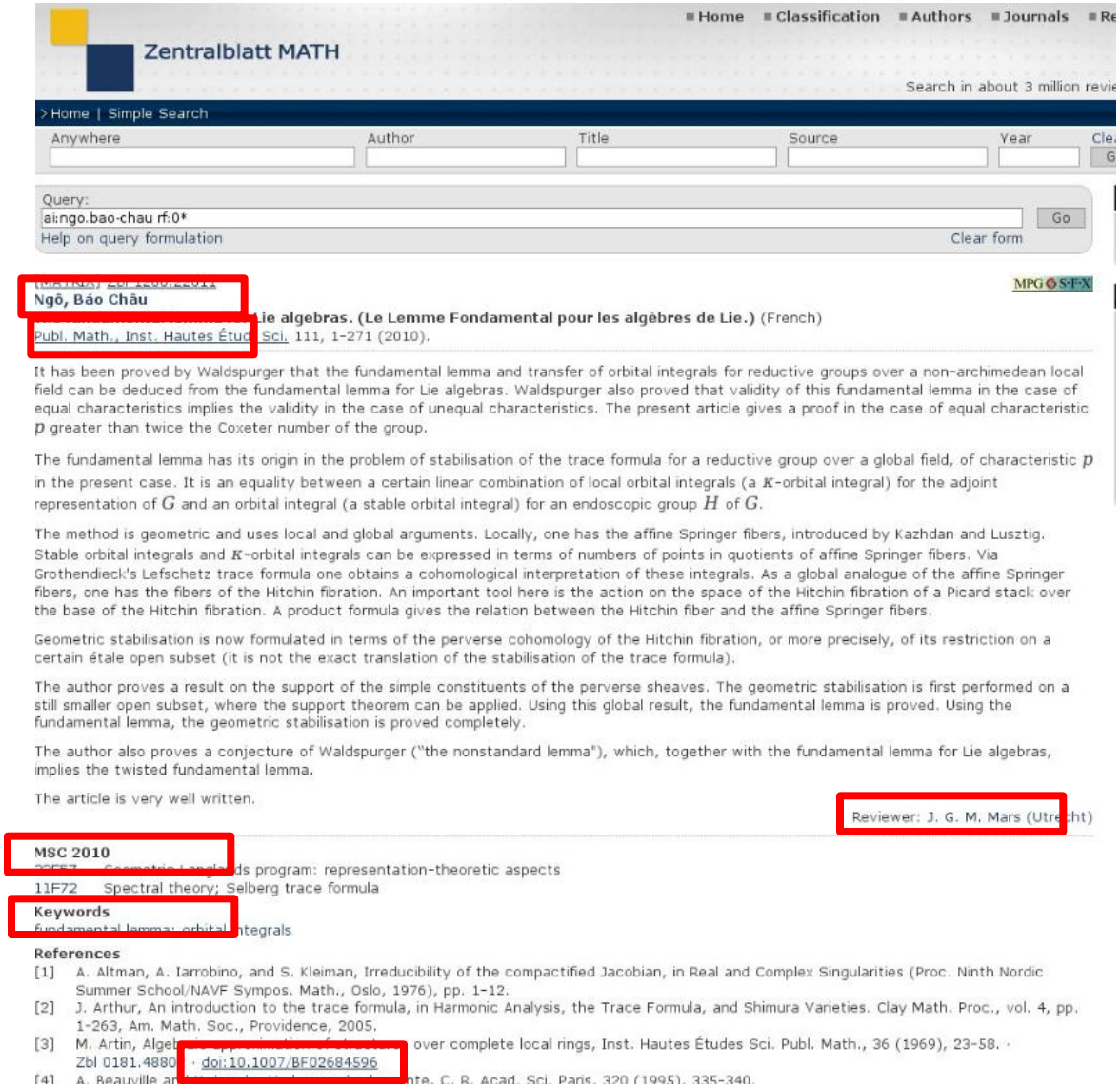
# Result – Single Item e.g. Review



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MPG S·F·X

**Ngô, Bảo Châu**

**ie algebras. (Le Lemme Fondamental pour les algèbres de Lie.)** (French)
Publ. Math., Inst. Hautes Étud Sci. 111, 1-271 (2010).

It has been proved by Waldspurger that the fundamental lemma and transfer of orbital integrals for reductive groups over a non-archimedean local field can be deduced from the fundamental lemma for Lie algebras. Waldspurger also proved that validity of this fundamental lemma in the case of equal characteristics implies the validity in the case of unequal characteristics. The present article gives a proof in the case of equal characteristic $p$ greater than twice the Coxeter number of the group.

The fundamental lemma has its origin in the problem of stabilisation of the trace formula for a reductive group over a global field, of characteristic $p$ in the present case. It is an equality between a certain linear combination of local orbital integrals (a $K$-orbital integral) for the adjoint representation of $G$ and an orbital integral (a stable orbital integral) for an endoscopic group $H$ of $G$.

The method is geometric and uses local and global arguments. Locally, one has the affine Springer fibers, introduced by Kazhdan and Lusztig. Stable orbital integrals and $K$-orbital integrals can be expressed in terms of numbers of points in quotients of affine Springer fibers. Via Grothendieck's Lefschetz trace formula one obtains a cohomological interpretation of these integrals. As a global analogue of the affine Springer fibers, one has the fibers of the Hitchin fibration. An important tool here is the action on the space of the Hitchin fibration of a Picard stack over the base of the Hitchin fibration. A product formula gives the relation between the Hitchin fiber and the affine Springer fibers.

Geometric stabilisation is now formulated in terms of the perverse cohomology of the Hitchin fibration, or more precisely, of its restriction on a certain étale open subset (it is not the exact translation of the stabilisation of the trace formula).

The author proves a result on the support of the simple constituents of the perverse sheaves. The geometric stabilisation is first performed on a still smaller open subset, where the support theorem can be applied. Using this global result, the fundamental lemma is proved. Using the fundamental lemma, the geometric stabilisation is proved completely.

The author also proves a conjecture of Waldspurger ("the nonstandard lemma"), which, together with the fundamental lemma for Lie algebras, implies the twisted fundamental lemma.

The article is very well written.

Reviewer: J. G. M. Mars (Utrecht)

**MSC 2010**
ds program: representation-theoretic aspects
11F72 Spectral theory; Selberg trace formula

**Keywords**
integrals

**References**
[1] A. Altman, A. Iarrobino, and S. Kleiman, Irreducibility of the compactified Jacobian, in Real and Complex Singularities (Proc. Ninth Nordic Summer School/NAVF Sympos. Math., Oslo, 1976), pp. 1-12.
[2] J. Arthur, An introduction to the trace formula, in Harmonic Analysis, the Trace Formula, and Shimura Varieties. Clay Math. Proc., vol. 4, pp. 1-263, Am. Math. Soc., Providence, 2005.
[3] M. Artin, Algeb over complete local rings, Inst. Hautes Études Sci. Publ. Math., 36 (1969), 23-58. · Zbl 0181.4880 · doi:10.1007/BF02684596
[4] A. Beauville an nte. C. R. Acad. Sci. Paris, 320 (1995), 335-340.

Single items even offer further searches for the:

- Author
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- Reviewer
- MSC code
- Keyword
- Link to cited articles

# **Classification:** Link to the MSC codes

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MSC2010 Code and/or Text

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### Mathematical Subject Classification 2010

Mathematical Reviews (MR) and Zentralblatt MATH (ZBMATH) collaborate in maintaining the Mathematics Subject Classification (MSC) which is used by these reviewing services and many others to categorize items in the mathematical sciences literature. The MSC has undergone a general revision, with some additions, changes, and corrections, to create MSC2010, the successor to MSC2000, the scheme for the past 10 years. MR and ZBMATH carefully considered input received from the community in recent years, especially since the announcement of the projected revision in December 2006, and used it in the preparation of their joint MSC revision. As anticipated, there are no changes at the two-digit level but refinements have been made at the three- and five-digit levels. By July 2009 MR and ZBMATH started to use MSC2010 as their classification scheme.

MR and ZBMATH welcome and encourage community adoption of MSC2010. Comments can be submitted through the Web form found at http://msc2010.org/feedback or by email to feedback@msc2010.org. All information about MSC2010 is jointly shared by MR and ZBMATH.

The editors and their staffs wish to express their gratitude to the numerous members of the community for their assistance in this lengthy revision process.

Download MSC2010 (PDF)

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# **Author Database -** The most popular search

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## ZBMATH Author Database

Author Name and/or Id:

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**Examples**

| | | | |
|---|---|---|---|
| Hua, Loo-Keng | Erdös, Paul | Werner, W* | Recillas Sevin |
| Nash, John* | Cirulis, J* | Kolmogorov, A* | Recillas Pishmish |

MathML, you can switch here. Further information on MathML is available in our help section.

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# Author Database

Any order of first / surname and abbreviations works, multiple author search (or/and combination) is possible. Example: kolmogorov

ZBMATH Author Database

Author Name and/or Id:

Kolmogorov | Go

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**5** identified authors found

1 **Kolmogorov, A.V.** Show 1 hits in ZBMATH · Open Author Profile
Author-Id: kolmogorov.a-v
Spellings: Kolmogorov, A.V. [1]

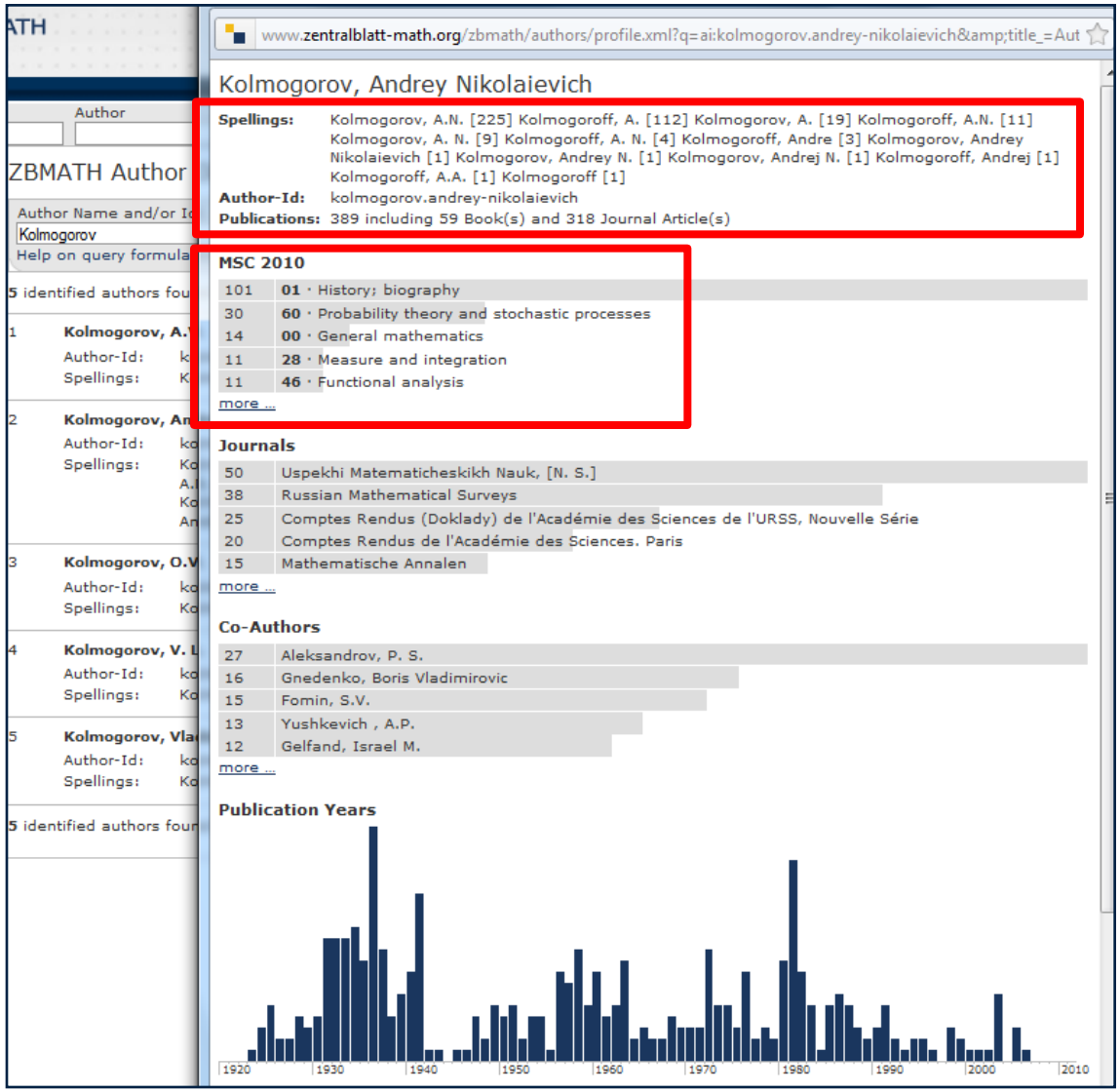
2 **Kolmogorov, Andrey Nikolaievich** Show 389 hits in ZBMATH · Open Author Profile
Author-Id: kolmogorov.andrey-nikolaievich
Spellings: Kolmogorov, A.N. [225]; Kolmogoroff, A. [112]; Kolmogorov, A. [19]; Kolmogoroff, A.N. [11]; Kolmogorov, A. N. [9]; Kolmogoroff, A. N. [4]; Kolmogoroff, Andre [3]; Kolmogorov, Andrey Nikolaievich [1]; Kolmogorov, Andrey N. [1]; Kolmogorov, Andrej N. [1]; Kolmogoroff, Andrej [1]; Kolmogoroff, A.A. [1]; Kolmogoroff [1]

3 **Kolmogorov, O.V.** Show 1 hits in ZBMATH · Open Author Profile
Author-Id: kolmogorov.o-v
Spellings: Kolmogorov, O.V. [1]

4 **Kolmogorov, V. L.** Show 7 hits in ZBMATH · Open Author Profile
Author-Id: kolmogorov.v-l
Spellings: Kolmogorov, V.L. [3]; Kolmogorov, V. L. [3]; Kolmogorov, V. [1]

5 **Kolmogorov, Vladimir** Show 8 hits in ZBMATH · Open Author Profile
Author-Id: kolmogorov.vladimir
Spellings: Kolmogorov, Vladimir [7]; Kolmogorov, V. [1]

# Author Profile (1)




Clicking on “Open Author Profile” – an additional window pops up giving a one page overview on:

**Author’s** details: different spellings of the name and their frequency in citations, the author id, the number of publications and the sort of source

**MSC2010** codes classifying the author’s publications sorted by number (5 most frequent, but option to display “more”)

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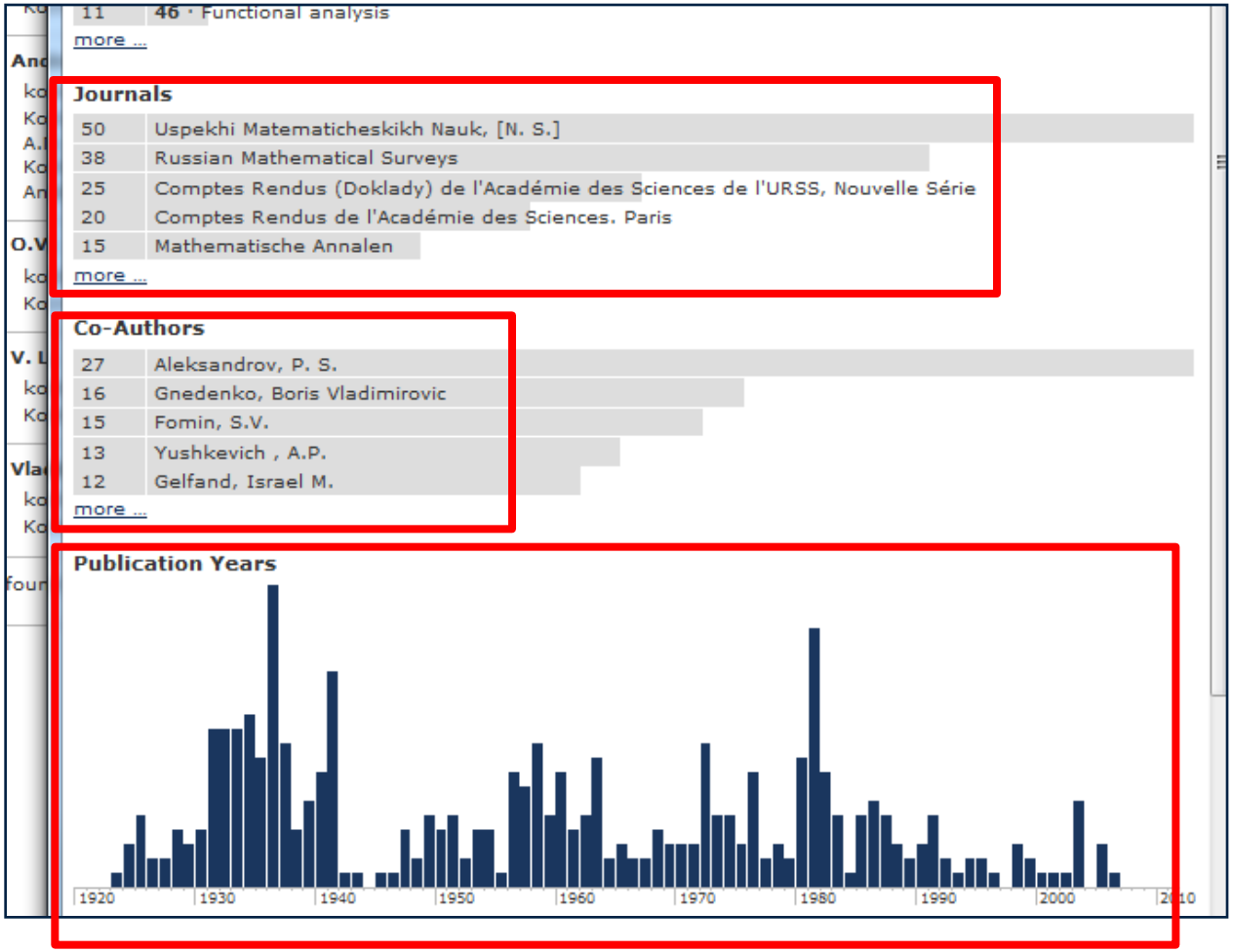
# Author Profile (2)

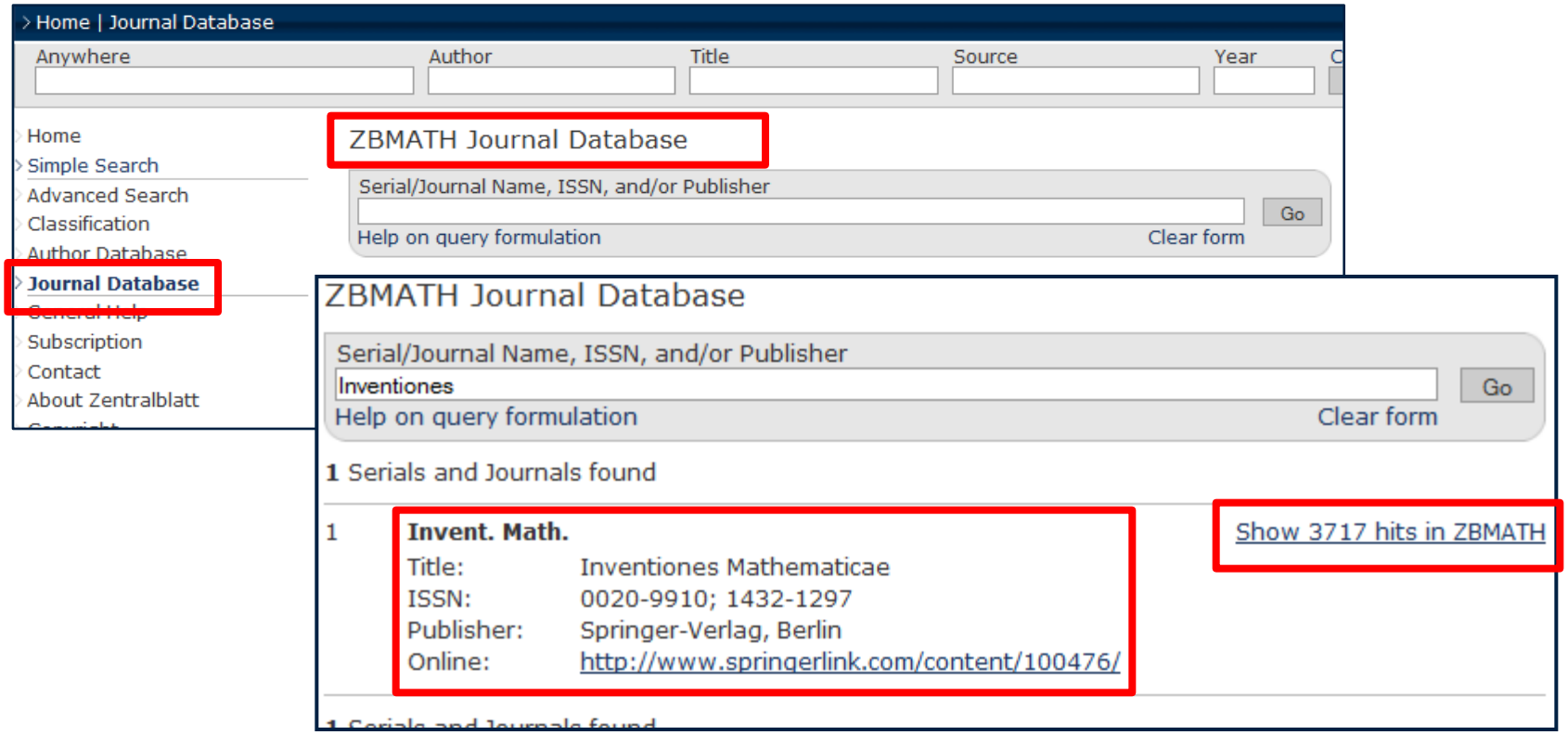



**Journals** in which the author published sorted by number (5 most frequent, but option to display “more”)

**Co-Authors** names sorted by frequency of co-authorship; co-authors names are hyperlinked to their author profile (5 most frequent, but option to display “more”)

**Publication Years** displayed in a bar chart for an overview at a glance

# Journal Database



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The One-line Search gives you the easiest access to our database. Alternatively, you can use the specified search fields above or the link to the Advanced Search that offers you an even more detailed search form.
Without specifying a particular search field in the One-Line Search, search is performed over all fields. If you wish to refine your original query, you can do so without leaving the hit list.

A new feature of ZBMath is MathML, which gives you the opportunity of directly showing mathematical symbols and formulas in your search results.

Query: Go

Help on query formulation Clear form

Of course, you can also still get the TeX source for each result. If you generally prefer to get your search result displayed in TeX instead of MathML, you can switch here. Further information on MathML is available in our help section.

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**Zentralblatt · Mile Stones**

**1931** · first Zentralblatt review
**1986** · 1 million items indexed
**2003** · 2 million items indexed
**2010** · 3 million items indexed

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## Search in Zentralblatt MATH Database

### Display fields

The DISPLAY fields which you may see in records of ZBMATH Database are summarized below.

- **au** authors, editors
- **ti** title
- **la** language
- **so** source
- **py** publication year
- **dt** document type
- **cc** classification code
- **ut** english keywords
- **br** biographical references
- **ab** review / abstracts
- **rv** reviewer
- **ci** citations

### Search fields

The searchable fields of the database MATH which are displayed in the search menu are listed below.

- **bi** basic index (including au ti,, ut, cc (text), ci, ab, br)
- **au** author(s), editors, author references
- **ai** identified author(s); will also be executed when clicking at the name of an identified author
- **ti** title
- **so** source
- **py** publication year
- **cc** classification code
- **rv** reviewer
- **dt** document type
- **an** accession number

### Proximity

A simple form of proximity searching is available for this database, in the following text fields: **ti**, **so**. A group of consecutive words may be searched for by selecting "expression".

### Truncation

The (right) truncation symbol * is used to retrieve various forms of your search terms. In the author search the truncation is used automatically.
Left truncation is not available.

### TeX

The description of mathematical contents within the records of MATH database requires the use of a formatting language which is capable of presenting special characters, formulae and formatting instructions. The most widely used and best known language for these purposes is TeX. Therefore TeX is used in the encoding of the data for MATH. However, a TeX-implementation on your computer is not a necessary condition for MATH Database to run.
But if high output quality is asked for, if it is desired to get output in a form similar to the printed version of Zentralblatt für Mathematik, then viewers for DVI, PostScript or PDF should be available on your system.

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## MathML

**Welcome to MathML at Zentralblatt.**

MathML (Mathematical Markup Language) enables you to display formulas directly on a web page. It is developed by the Math Working Group of the World Wide Web Consortium (W3C).

**System requirements**

In order to make use of this feature you need a MathML-compliant browser and, depending on the browser you choose, you may need to do some additional installations:

For **Mozilla** (from v. 1.1) / **Netscape** (from v. 7.0) special fonts are required. Information on these fonts and links to them can be found on Fonts for MathML-enabled Mozilla (a download is provided here).

For **Internet Explorer** (from v. 6.0) you need to install the free MathPlayer plug-in.

We hope you will enjoy the additional comfort when reading Zentralblatt reviews containing mathematical formulas. As we are still working on improving this service we are grateful for any kind of feedback. Particularly, if you should encounter any problems please let us know.

**How it is produced**

There are many tools for converting TeX source code into MathML.
We are using Tralics, a free software developed by the Apics Team of Inria.