

Reference databases as tools for the WDML

The case of Zentralblatt MATH

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MSRI Digitizing Workshop, April 2005

Overview

- 1. Database links
- 2. Reference links
- 3. Export and import of metadata
- 4. Registration support

Planning the DML

- Steering Committee, IMU Liaison Committee
- Working groups
 - Content
 - Metadata
 - Rights and Licenses
 - Archiving
 - Economic Model
 - Technical Standards
- Meetings in Washington D.C., July 2002, Grenoble, March 2003, Göttingen, May 2003.
- Special session at the ECM satellite conference, June 2004
- Central administrative tool: Digitisation Registry

Access facilities

- Access structures developed by the projects themselves.
- Access structures developed by agencies like MetaPress
- EULER
- Reference databases:
 - Zentralblatt MATH, MathSciNet
 - MATHDI
 - Logics database
 - STMA-Z
- Navigation through reference links

ZBL facilities

- Comprehensive review database since 1868
- Jahrbuch included
- Links to all electronic offers in mathematics
- Search facilities:
 - simple
 - advanced
 - expert
 - look-up
- Access through MSC and journals database



The Jahrbuch Project

Electronic Research Archive for Mathematics (ERAM)



1868-1930 (only few gaps; data increase every month)

[Content](#) | [Project description](#) | [Advanced SEARCH](#) | [Free SEARCH](#) |

Start Retrieval

[Help for searching](#)

Clear Form

Author is (are)

Clebsch, A.

[Lastname or Lastname, Initial *Example: Lie or Lie,S*]

[Several authors: Name1, Initial1; Name2, Initial2 *Example: Klein,F; Lie,S*]

Title contains the words

Global index contains the words

Source contains the words

Classification is (are)

JFM. No.: [Changed!! e.g. search for volume 2: JFM 02* or 02*]

Reviewer:

The above fields are connected with: and or

Restricted search:

Publication year: to

Document type: Book Journal article Thesis

Your query: au = (CLEBSCH, A*)

Answers 1-10 (of 57)

[\[New query form\]](#)

Display checked entries html complete Unmark all

1. [JFM 01.0045.04 Clebsch, A.](#)

Ueber eine Eigenschaft der Functionaldeterminanten. (German)

Borchardt J. LXIX. 355-358. *Published:* (1868)

MSC 1991: *[26B10](#), *Reviewer:* Netto, Dr. (Berlin)

2. [JFM 01.0234.02 Clebsch, A.](#)

Note sur les surfaces algébriques. (French)

C. R. LXVII. 1238. *Published:* (1868)

MSC 1991: *[51N35](#) [14J25](#), *Reviewer:* Kretzschmer, Dr. (Frankfurt a.O.)



3. [JFM 01.0258.01 Clebsch, A.](#)

Ueber die Flächen vierter Ordnung, welche eine Doppelcurve zweiten Grades besitzen. (German)

Borchardt J. LXIX. 142-147. Berl. Monatsber. 1868. *Published:* 1868

MSC 1991: *[14J25](#) [14J17](#), *Reviewer:* Schuhmann, Dr. (Berlin)

4. [JFM 02.0058.02 Clebsch, A.](#)

Zur Theorie der binären algebraischen Formen. (German)

Gött. Nachr. 405-409. 1870.* Clebsch Ann. III. 265-267. 1870. *Published:* 1870

, *Reviewer:* Netto, Dr. (Berlin)

5. [JFM 02.0062.01 Clebsch, A.; Gordan, P.](#)

Ueber biternäre Formen mit contragredienten Variabeln. (German)

Clebsch Ann. I. 359-400. 1869. *Published:* 1869

, *Reviewer:* Netto, Dr. (Berlin)

6. [JFM 02.0064.01 Clebsch, A.; Gordan, P.](#)

Ueber die Theorie der ternären cubischen Formen. (German)

Clebsch Ann. I. 57-89. 1869. *Published:* 1869

, *Reviewer:* Netto, Dr. (Berlin)



1. JFM 01.0234.02[Clebsch, A.](#)**Note sur les surfaces algébriques.**

(French)

Title in English: Note on algebraic surfaces.

[J] C. R. LXVII. 1238.

Published: (1868)

Analog wie man Curven in Geschlechter theilt (cf. Clebsch und Gordan, Theorie der Abelschen Functionen, oder Cremona Preliminari di una teoria geom. delle superficie), kann man auch Flächen eintheilen. In dasselbe Geschlecht gehören zwei Oberflächen n^{ten} Grades, wenn sich von ihren Gleichungen $f=0$, $\varphi=0$ die eine auf rationale, algebraische Weise in die andre transformiren lässt, so dass jedem Punkt der einen nur ein Punkt der andern entspricht. Verfasser giebt nun an, was man als Ordnungszahl dieser Geschlechter ansehen kann. Er nimmt der Einfachheit wegen nur Rücksicht auf Flächen mit regelmässigen Singularitäten, d. h. solchen, die sich entweder auf jeder Fläche selbst oder auf ihrer Reciproken finden. Dann ist Ordnungszahl des Geschlechtes die Zahl p der willkürlichen Constanten einer Fläche n^{ten} Grades, welche durch die Doppel- oder Rückkehr-Curven (arêtes de rebroussement) auf der betrachteten Fläche n^{ten} Grades $f=0$ gelegt werden kann. Clebsch zeigt, dass diese Zahl für alle Flächen desselben Geschlechtes constant bleibt.

[[Kretzschmer, Dr. \(Frankfurt a.O.\)](#)]*Subject heading:* Achter Abschnitt. Analytische Geometrie. Capitel 3. Geometrie des Raumes B. Algebraische Curven und Flächen*MSC 1991:**[51N35](#) Questions of classical algebraic geometry[14J25](#) Special surfaces*Keywords:* Algebraic surfaces*Editor:* Bolondi, G. (Trento)

On line ordering services

2. JFM 02.0064.01[Clebsch, A.](#); [Gordan, P.](#)**Ueber die Theorie der ternären cubischen Formen.**

(German)

[J] Clebsch Ann. I. 57-89. 1869.

Published: 1869

Brioschi hat in den C. R. 1863 eine typische Darstellung der ternären cubischen Formen gegeben. Hier wird eine ähnliche typische Darstellung entwickelt, indem Methoden auseinandergesetzt werden, alle zu jener Function gehörigen algebraischen Formen durch vier Covarianten und drei in Bezug auf die Liniencoordinaten u_1, u_2, u_3 lineare Zwischenformen auszudrücken. Um aber auch zugehörige Formen bequem und naturgemäss durch einfache zugehörige Formen darzustellen, wird ein zweites System gegeben, bei dem die Grundformen aus vier zugehörigen Formen und drei in Beziehung auf x linearen Zwischenformen bestehen. -- Der Formelreichtum der Arbeit macht es uns unmöglich, diese Abhandlung ins Einzelne zu verfolgen, ohne bis zum Einzelnen zu kommen.

[[Netto, Dr. \(Berlin\)](#)]*Subject heading:* Zweiter Abschnitt. Algebra. Capitel 2. Theorie der Formen.

Link to full text



On line ordering services



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Ueber die Theorie der ternären cubischen Formen.

[Clebsch, A., Gordan, P.](#)



In Periodicals

[Mathematische Annalen](#) Volume: 1

Ueber die Theorie der ternären cubischen Formen.

Von A. CLEBSCH und P. GORDAN in GÜSSEN.

Eine typische Darstellung der ternären cubischen Formen hat, auf Grund seiner Erweiterung der HERMITESCHEN Theorie der „formes associées“, Hr. BRIOSCHI in den Comptes Rendus von 1863, erste Hälfte, p. 661 gegeben. Der vorliegende Aufsatz hat den Zweck, die Resultate des Hrn. BRIOSCHI, oder vielmehr eine der seinigigen ähnliche typische Darstellung aus der Theorie der ternären cubischen Formen zu entwickeln, und die dabei auftretenden Gestalten mit dieser Theorie in Zusammenhang zu bringen. In diesem Sinne wird das Folgende vielleicht für Diejenigen nicht ohne Interesse sein, welche der Theorie dieser Formen ein näheres Studium widmen.

§. 1.

Grundformeln.

Wir adoptiren im Folgenden größtentheils die Bezeichnungen des Hrn. ARONHOLD. Sei f die gegebene Function dritter Ordnung von x_1, x_2, x_3

$$f_i = \frac{\partial f}{\partial x_i}, \quad f_{ij} = \frac{\partial^2 f}{\partial x_i \partial x_j}$$

und

$$A = 6 \sum \pm f_{11} f_{22} f_{33}.$$

Als zusammengesetzte Function benutzen wir $\Delta f = A \Delta$, und haben demnach ARONHOLD (indem aus der Formeln der Clebsch'schen Theorie)

Reference links

- Add links to the electronic version to the cited reference
- URL, DOI, ZBL (or MR) annotation numbers
- Clickable in PDF
- **Matching list MR - ZBL**
- Usability independent from subscription
- Link to the source or link to a page from where the source could be found and accessed
- Addition to the metadata

MATH query via Zbl-number, step 1

The screenshot shows the Netscape browser window titled "Zentralblatt MATH - Search - Netscape". The address bar contains the URL <http://www.emis.de/ZMATH/en/quick.html>. The browser's menu bar includes "Datei", "Bearbeiten", "Anzeigen", "Gehe", "Lesezeichen", "Extras", "Fenster", and "Hilfe". The browser's toolbar shows navigation buttons (back, forward, home, stop) and a search button labeled "Suchen".

The main content area of the browser displays the Zentralblatt MATH search interface. At the top, there is a navigation bar with "Search", "Advanced Search", "Command Search", and "Citation Checker" tabs. A "Contact" link is visible on the right. Below the navigation bar, there are several sections:

- News:** A yellow header with a list of statistics: "Vols. 1-1034 in database.", "More than 2.000.000 entries.", "About 250.000 links to e-journals.", and a "Release info" link.
- Services:** A yellow header with links for "Classification", "Serials and Journals", and "Reviewer".
- Information:** A yellow header with links for "About Zentralblatt MATH" and "Mirror sites".

The central search form is titled "Search" and includes a "Help" link. It contains the following fields and options:

- Search:** A button to execute the search.
- Clear Form:** A button to reset the search form.
- Author:** A dropdown menu set to "is (are)" and a text input field. Below it is the example "[Example: Wiles; Taylor, R]".
- Title:** A dropdown menu set to "words" and a text input field.
- Global Index:** A dropdown menu set to "words" and a text input field.
- Source:** A dropdown menu set to "words" and a text input field.
- Classification:** A dropdown menu set to "is (are)" and a text input field.
- Document type:** Three checkboxes: "Book", "Journal Article", and "Conference Article".
- Years:** Two text input fields separated by a hyphen.
- Display:** A text input field containing "20" and the text "entries per page.".
- Format:** Two dropdown menus set to "html" and "short".
- Zbl No.:** A text input field containing "1034.58026".

At the bottom of the page, there is a logo for Zentralblatt MATH and a copyright notice: "Copyright Zentralblatt MATH : © European Mathematical Society, FIZ Karlsruhe & Springer-Verlag. [edbm/w3] Retrieval & display software : © Cellule MathDoc, UJF & CNRS."

MATH query, step 2

The screenshot shows a Netscape browser window with the title "Search results an = (1034.58026) -Netscape". The address bar contains the URL "http://www.emis.de/cgi-bin/zmen/ZMATH/en/quick.html". The browser's menu bar includes "Datei", "Bearbeiten", "Anzeigen", "Gehe", "Lesezeichen", "Extras", "Fenster", and "Hilfe". The toolbar contains navigation buttons (back, forward, home, stop), a search button labeled "Suchen", and icons for email, AIM, and other services. The main content area displays the Zentralblatt MATH logo and navigation links: "[New query form]" and "[Contact]". Below the logo, the text reads "Your query: an = (1034.58026)". Under the heading "Answers 1-1 (of 1)", a search result is listed: "Zbl 1034.58026 [Guerini, Pierre; Savo, Alessandro](#) Eigenvalue and gap estimates for the Laplacian acting on S^p -forms. (English) [Trans. Am. Math. Soc.](#) 356, No. 1, 319-344 (2004). MSC 2000: *58J50 58J32, *Reviewer:* Jochen Denzler". Below this result is another "[New query form]" link. A second "Answers 1-1 (of 1)" section follows, containing the text "Zentralblatt MATH ([E-Mail](#)), Copyright (c) 2004 European Mathematical Society, FIZ Karlsruhe & Springer-Verlag." The status bar at the bottom shows the full URL: "http://www.emis.de/cgi-bin/zmen/ZMATH/en/quick.html?fi...=18maxdocs=20&type=html&an=1034.58026&format=complete".

MATH query, step 3

Search results an = (1034.58026) -Netscape

http://www.emis.de/cgi-bin/zmen/ZMATH/en/quick.html?first=1&maxdocs=20&type=h

Zentralblatt MATH [\[New query form\]](#)
[Contact](#)

Your query: an = (1034.58026)

Answers 1-1 (of 1)

Zbl 1034.58026
[Guerini, Pierre; Savo, Alessandro](#)
Eigenvalue and gap estimates for the Laplacian acting on p -forms. (English)
[] [Trans. Am. Math. Soc.](#) 356, No. 1, 319-344 (2004). [ISSN 0002-9947 1088-6850]

For the Hodge Laplacian $\Delta_p = \delta d + d \delta$ on p -forms on an n -dimensional manifold M (possibly) with boundary, the authors study the " p -gap" $\mu_{1,p} - \mu_{1,p-1}$, i.e., the difference of the first eigenvalues for Δ_p and Δ_{p-1} under absolute boundary conditions (generalization of Neumann conditions to forms). They give examples that for any given diffeomorphism class there is a metric that makes the p -gap positive, negative, or zero, with only four exceptional cases of (p, sign) pairs (two known to be impossible, two open). In these examples, the metrics can be chosen euclidean, if the topology permits Euclidean metrics. They also show that for p -convex (the sum of the p smallest principal curvatures on the boundary is pointwise nonnegative) Euclidean domains, the p -gap is nonnegative. Finally, they give lower bounds for $\mu_{1,p}$ in terms of the principal curvatures of ∂M and the curvature operator on M . This is reporting only their main results.
[[Jochen Denzler \(Knoxville\)](#)]

MSC 2000:
*58J50 Spectral problems; spectral geometry; scattering theory
58J32 Boundary value problems on manifolds

Keywords: Hodge Laplacian; eigenvalues; gaps; convex manifolds
[Cited in Zbl. reviews...](#)

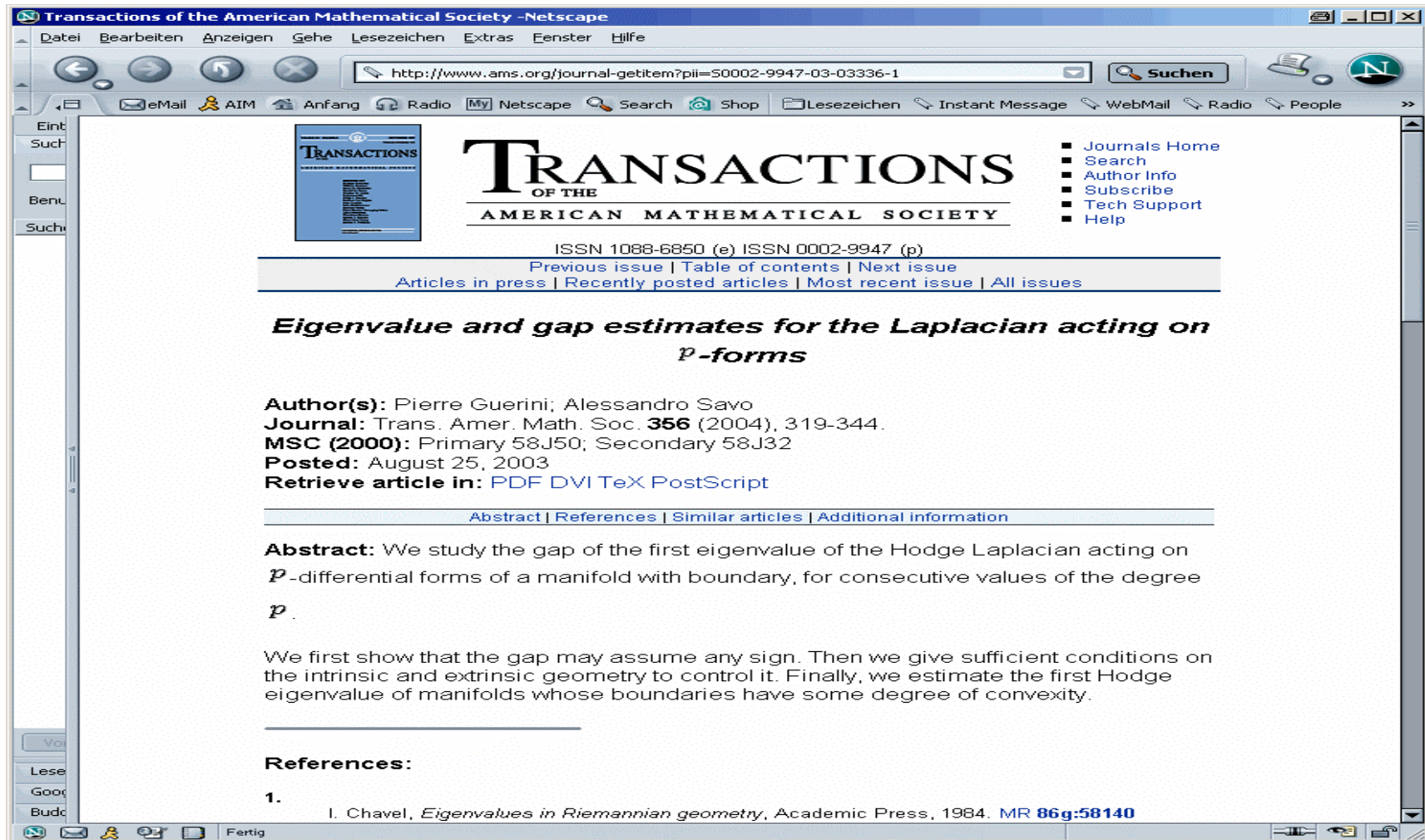
Link to full text On line ordering services

[\[New query form\]](#)

Answers 1-1 (of 1)

http://www.ams.org/journal-getitem?pii=S0002-9947-03-03336-1

MATH query, step 4



Transactions of the American Mathematical Society - Netscape

http://www.ams.org/journal-getitem?pii=50002-9947-03-03336-1

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Eigenvalue and gap estimates for the Laplacian acting on p -forms

Author(s): Pierre Guerini; Alessandro Savo
Journal: Trans. Amer. Math. Soc. **356** (2004), 319-344.
MSC (2000): Primary 58J50; Secondary 58J32
Posted: August 25, 2003
Retrieve article in: [PDF](#) [DVI](#) [TeX](#) [PostScript](#)

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Abstract: We study the gap of the first eigenvalue of the Hodge Laplacian acting on p -differential forms of a manifold with boundary, for consecutive values of the degree p .

We first show that the gap may assume any sign. Then we give sufficient conditions on the intrinsic and extrinsic geometry to control it. Finally, we estimate the first Hodge eigenvalue of manifolds whose boundaries have some degree of convexity.

References:

1. I. Chavel, *Eigenvalues in Riemannian geometry*, Academic Press, 1984. [MR 86g:58140](#)

Export and import

- Provide digitisation projects with core metadata
- Enhancements
 - English title and other information in English
 - MSC
- Link to ZBL can be store immediately
- Export of abstract possible (RusDML, DML-CZ)
- Correction of data available
- Addition of data for gaps

Registration support

- Registration of digitised material has been addressed by the DML planning group
- Ongoing registration activities not complete
- Two levels: working mathematician, digital repository
- Combined support from reviewing journals
 - Associate information with journals list
 - Extend journals list to publications not covered by these services
 - Integrate this information into the database navigation facilities
 - Co-ordinate this with more sophisticated registries
 - Import database records for the items not covered

Registration Problems

- Reviewing databases have reduced coverage of what we have in mind for the DML
- ZBL and MR have different coverage
- What do we have in mind to be covered by DML?
- What do we consider as mathematics? Discussed by the working group for content in the planning group
 - Time scale
 - Level of quality
 - Fuzzy borderline to applications and other sciences
 - Geographic distribution
- Define a first set of content to be considered (more than the scope of MR/ZBL).

Adresses



- Thank you for the attention
- <http://www.emani.org>
- E-Mail: Wegner@math.tu-berlin.de
- <http://www.emis.de>