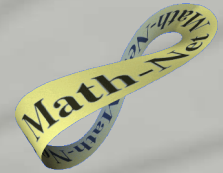




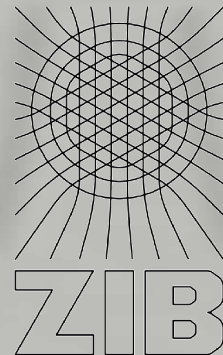
The IMU Website and Math-Net



New Developments in Electronic
Publishing of Mathematics

Satellite Conference to ECM 2004,
Stockholm

Wolfgang Dalitz, Zuse Institute Berlin (ZIB)



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Math-Net Howtos (electronic documents)

- Howto structure/classify
- Howto organize/provide
- Howto retrieve/access

Math-Net Page for mathematical
institutes and departments





Mathematisches Institut Universität Köln



Local Contact

Homepage

Univ.Homepage

International Services

[Sigma](#)

[Navigator](#)

[MPRESS](#)

[Persona Math](#)

[MathLinks](#)

[eJournals](#)

[Contact](#)

Services of Math-Net.de

[Regional Services](#)

[Software](#)

[Newsletter](#)

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General

[More Topics](#)

- ▶ [About us](#)
- ▶ [Organization of the Department](#)
- ▶ [Information for Prospective Students](#)
- ▶ [Community Outreach](#)
- ▶ [Information for Visitors](#)

People

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- ▶ [Schedule of Events](#)
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Research

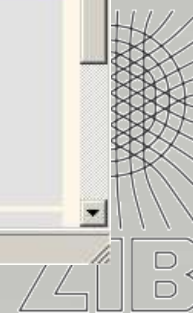
- ▶ [Research Groups](#)
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Teaching

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- ▶ [Course Information and Materials](#)

Information Services

- ▶ [Computing Services](#)
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- ▶ [Bibliographic Databases](#)



What is the IMU?

The **objectives** of the International Mathematical Union (IMU) are:

- b. To promote international **cooperation** in mathematics
- c. To **support** and assist the **International Congress of Mathematicians** (ICMs) and other international scientific meetings or conferences
- d. To encourage and **support** other international mathematical activities considered likely to contribute to the **development of mathematical science** in any of its aspects, pure, applied, or educational

....

(from the IMU statutes)



Member structure of IMU

- IMU members are countries
 - 65 countries from 5 continents
- Each country is represented by an "adhering organization" which can be
 - academy society,
 - mathematical society
 - research council
 - or some other institution or association of institutions, or an appropriate agency of its governmental



Organizational Structure

- Executive Committee
 - „ ... IMU is administered by an Executive Committee (EC) ... ”
- General Assembly (GA)
 - „ ... GA of the IMU **consists of delegates** appointed by the Adhering Organizations, **together** with the members of the **Executive Committee** ... ”
- Commissions



Commissions

- International Commission of Mathematical Instruction (ICMI) [Teaching]
- Commission on Development and Exchanges (CDE)
- International Commission on the History of Mathematics (ICHM)
- Committee on Electronic Information and Communication (CEIC)



IMU Webserver

(www.mathunion.org)

- The EC of IMU decided that the IMU-server (again) is hosted and maintained in Berlin
- Redesign
 - Content
 - Structure
- Extensions





International Mathematical Union (IMU)

- ▶ Home
- ▶ General
- ▶ Members
- ▶ Organization
- ▶ Publications
- ▶ Activities
- ▶ Further Info

▶ ICM 2006



INTERNATIONAL CONGRESS OF MATHEMATICIANS MADRID 2006

▶ Contact

General

- ▶ About
- ▶ Office
- ▶ Awards
- ▶ History

Publications

- ▶ Circular Letters to Adhering Organizations
- ▶ Bulletins
- ▶ IMU-Net: Electronic Newsletter
- ▶ News

Members

- ▶ Member Countries
- ▶ Affiliated Members
- ▶ Candidacy for Membership

Activities

- ▶ International Congress of Mathematicians (ICM)
- ▶ ICM related and other Grants
- ▶ Developing Countries (CDE)
- ▶ Mathematical Instruction (ICMI)
- ▶ Electronic Information and Communication (CEIC)

Organization

- ▶ Executive Committee
- ▶ General Assembly
- ▶ Statutes
- ▶ Committees / Commissions

Further Info

- ▶ Mathematical Societies
- ▶ Links to the Mathematical World
- ▶ Electronic World Directory of Mathematicians

Imprint

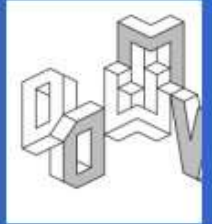
last update: 2004-03-01

© IMU

<http://www.mathunion.org>



Deutsche Mathematiker - Vereinigung



Local Contact

Homepage

- International Services
- Sigma**
- Navigator
- MPRESS
- Persona Math
- MathLinks
- eJournals
- Contact

- Services of Math-Net.de
- Regional Services**
- Software
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- Contact
- Help

General [▶ More Topics](#)

- ▶ **About the Society**
- ▶ **Office**
- ▶ **History**
- ▶ **Awards**

Members

- ▶ **Membership**
- ▶ **Dues**
- ▶ **Reciprocal Societies**
- ▶ **Honorary Members**

Organization

- ▶ **Board**
- ▶ **Committees / Deputies**
- ▶ **Interest Groups**

Publications

- ▶ **Newsletters**
- ▶ **Journals**
- ▶ **Proceedings**

Activities

- ▶ **Meetings**
- ▶ **Joint Initiatives**
- ▶ **Recommendations / Reports**

Further Information

- ▶ **Mathematical Societies**
- ▶ **Mathematical Departments**
- ▶ **Job Offers**
- ▶ **Further Links**



Some Details

- Structure is the prototype for the Math-Net Page for mathematical society
- No RDF-data (yet)
- Most of the material are general descriptions and reports from the different committees (CDE, ICMI, CEIC, ...)



IMU Webserver

(www.mathunion.org)

- To come:
 - Content Management System (CMS)
 - Security
- Extensions
 - IMU-Net
 - EWDM



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IMU-Net

- IMU-Newsletter
 - bimonthly electronical newsletter
 - „The newsletter aims to **improve communication between IMU and the worldwide mathematical community**, by reporting decisions and recommendations of IMU ...”
- Editor
 - Mireille Chaleyat-Maurel,
Université René Descartes, Paris, France



- ▶ Home
- ▶ General
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- ▶ Further Info

Issue	Date	Contents
▶ No. 5	May 2004	From the Editor News from the IMU Logo competition IMU on the Web International Council on Industrial and Applied Mathematics (ICIAM) ICMI 2004 awards Miguel de Guzman Experiencing Mathematics Subscribing to IMU-Net
▶ No. 4	March 2004	From the Editor Abel Prize 2004 ICM 2006 NEWS Bids for ICM 2010 IMU on the Web: what can you do about journal prices? PACOM 2004 International Commission on the History of Mathematics (ICHM) Subscribing to IMU-Net
▶ No. 3	January 2004	From the Editor European Mathematical Society (EMS) Mathematical Union of Latin America and the Caribbean (UMALCA) Commission on Development and Exchanges (CDE) International Commission on Mathematical Instruction (ICMI) ICME 10: "Early bird" registration ending soon New developments in mathematical publishing Subscribing to IMU-Net

Conclusion after the first 5 issues

- Acceptance:
 - Nearly 4,000 subscribers
- Archive
- ICM 2006



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EWDM (I)

from IMU-Net #2:

“After the **discontinuation of the WDM** was announced in IMU-Net 1 a number of colleagues asked whether it would be possible to **establish an electronic version of WDM**. ...

Due to the limited financial means of the IMU there is no way to set up and maintain a central registry such as the combined membership list of AMS/MAA/SIAM/etc., ...

It seems feasible, though, to **keep a central list** - based on distributed input and voluntary contributions. CEIC proposes to give this idea a try and **start with a basic version of an Electronic World Directory of Mathematicians (EWDM)**.“



EWDM (II)

- Registration via the IMU server
- Very small solution:
 - Mandatory
 - Name (last name, first name)
 - E-mail
 - Optional
 - Country
 - URL of the homepage
- Handshake to verify the data (e-mail)



- [Search](#)
- [Join](#)
- [Leave](#)
- [About](#)

Currently there are 712 persons registered to EWDM

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

Note: the encoding of the email addresses does not allow to retrieve the addresses in a machine-readable form too easily.

Name	Firstname(s)	Country	Em@il
A			bac
AbuRugayia	Nedal	Israel	ml_47@yahoo.com
Acheson	David John	United Kingdom	david.acheson@jesus.ox.ac.uk
Adriaenssens	jan	Belgium	jan.adriaenssens@ua.ac.be
Aitchison	Peter W.	Canada	aitchis@cc.umanitoba.ca
Al-Hassan	Qassem	United Arab Emirates	qassem@sharjah.ac.ae
Al-Showaikh	Faisal	Bahrain	faisal@sci.uob.bh
ALBERTI	Giovanni	Italy	alberti@mail.dm.unipi.it
Alefeld	Goetz	Germany	goetz.alefeld@mathematik.uni-karlsruhe.de
Alexandrov	Victor	Russia	alex@math.nsc.ru
Ali	Rosihan M.	Malaysia	rosihan@cs.usm.my
Altomare	Francesco	Italy	altomare@dm.uniba.it
Amyari	Maryam	Iran	amyari@mshdiau.ac.ir
anichini	giuseppe	Italy	anichini@dma.unifi.it
Anthonissen	Martijn	Netherlands	m.j.h.anthonissen@tue.nl
Antoine	Xavier	France	antoine@mip.ups-tlse.fr
Armbruster	Michael	Germany	marmbru@mathematik.tu-chemnitz.de
Arnold	Douglas N.	United States of America	arnold@ima.umn.edu
Arranz	Aurelio	United Kingdom	aurelio.arranzcarreno@linacre.ox.ac.uk
Asavanant	Jack	Thailand	ajack@chula.ac.th
Aslaksen	Helmer	Singapore	aslaksen@math.nus.edu.sg
Asor	Vincent E.	Nigeria	vincent.asor@shell.com
Aussel	Didier	France	aussel@univ-perp.fr

Remarks

- More than 700 entries in 6 months
- Nearly all have URL and Country
- E-Mail addresses are encoded in a non-machine-readable form
- Partially much more information than in WDM
- Sort criteria Names (default) and Country
- Not many so called „Professional Homepages“
- Serious List



Medium-term EWDM Tasks

- Search engine that runs over the homepages
- More sort criteria
- Improvement to update an entry:
 - Update = delete and re-join
- Prevent misuse
 - Spam
 - Serious list for mathematicians
 - Security issues



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EWDM and the Personal Homepage Maker

The screenshot shows a web browser window with the address bar displaying <http://www.mathunion.org/MPH-EWDM/>. The browser interface includes a menu bar with options like 'Datei', 'Bearbeiten', 'Ansicht', 'Favoriten', and 'Extras', along with a search bar and various navigation icons. The website content is displayed on a blue background with a white sidebar on the left. The sidebar contains the IMU logo and a navigation menu with items: Home, General, Members, Organization, Publications, Activities, and Further Info. The main content area features the title 'Personal Homepages and the World Directory of Mathematicians' and a 'Contact' link. The text explains that the IMU has decided to discontinue the World Directory of Mathematicians (WDM) and instead promote the Electronic World Directory of Mathematicians (EWDM), which became operational on December 1, 2003. It includes sections for 'The Personal Homepage Call' and 'The Electronic World Directory of Mathematicians Call', both of which encourage mathematicians to create and register their homepages. A list of links is provided at the bottom, including 'Recall: The Institutional Math-Net Page' and 'Offer your Professional Homepage' with a sub-link '2.1 Your first homepage'.

IMU
International
Mathematical
Union

**Personal Homepages
and the
World Directory of Mathematicians**

[Contact](#)

Personal Homepages and the World Directory of Mathematicians

The International Mathematical Union (IMU) has decided to discontinue publication of the World Directory of Mathematicians ([WDM](#)), and suggests to set up a distributed electronic version, to be called Electronic World Directory of Mathematicians ([EWDM](#)). The EWDM has become operational on December 1, 2003. The IMU combines this proposal with a call to every mathematician to offer a structured homepage on the Web.

The Personal Homepage Call

IMU asks every mathematician to set up and maintain a personal homepage. IMU requests to offer the homepage in a user-friendly way. IMU suggests to structure the homepage along the lines of the Mathematician's Professional Homepage ([MPH](#)).

The Electronic World Directory of Mathematicians Call

IMU plans to set up and maintain an Electronic World Directory of Mathematicians ([EWDM](#)). Every mathematician who has a homepage is asked to register the homepage through the [EWDM registration mechanism](#).

Details about the MPH structure and the EWDM registration procedure can be found below.

1. [Recall: The Institutional Math-Net Page](#)
2. [Offer your Professional Homepage](#)
 - o 2.1 [Your first homepage](#)

Long-term plans

Prof. Dr. Martin Grötschel

Konrad-Zuse-Zentrum für Informationstechnik Berlin (ZIB)

Technische Universität Berlin
DFG-Forschungszentrum
"Mathematik für Schlüsseltechnologien"

Technische Universität Berlin
Institut für Mathematik

General Information	Other	Research	Other
<ul style="list-style-type: none">▶ Contact Information▶ Information for Visitors▶ Academic Positions/Professional History▶ Awards & Distinctions▶ Curriculum Vitae		<ul style="list-style-type: none">▶ Research Areas and Applications▶ Other Scientific Interests▶ Publications▶ Research Projects / Grants▶ Talks / Presentations▶ Software	
Collaborations & Cooperations	Other	Teaching	Other
<ul style="list-style-type: none">▶ Genealogy▶ Students▶ Co-Authors and Collaborators▶ Industrial Cooperation		<ul style="list-style-type: none">▶ Information for Students▶ Current and Future Teaching▶ Courses taught▶ Teaching and Course Materials	
News and Miscellaneous	Other	Professional Activities	Other
<ul style="list-style-type: none">▶ Announcements▶ Future Conferences and Meetings▶ Other Interests		<ul style="list-style-type: none">▶ Editorial Responsibilities / Refereeing▶ Professional Societies /Administrative Service	

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... Math-Net ...

- Math-Net is supported by IMU and steered by CEIC (steering body)
- In 2004 implementation of the Google-algorithms for a better ranking within the search engines (only a test version)



Google idea: PageRank

- Ian Rogers, IPR Computing Ltd., ian@iprcom.com

The Google Pagerank Algorithm and How It Works

Last edited: 16th May 2002

<http://www.iprcom.com/papers/pagerank/index.html>

In short:

"PageRank is a „vote”, by all the other pages on the Web, about how important a page is.

A link to a page counts as a vote of support."



PageRank as a Measure

- PageRank of a web document could be understood as a measure of the importance of a document
- This measure corresponds with the subject feeling of how importance a document is
- The calculation of the PageRank is an iterative task (and quite simply to implement)



PageRank

Sergey Brin and Lawrence Page

The Anatomy of a Large-Scale Hypertextual Web Search Engine

<http://www.iprcom.com/papers/pagerank/index.html>

"We assume *page A has pages T1...Tn which point to it* (i.e., are citations). The parameter *d is a damping factor* which can be set between 0 and 1. We usually set *d to 0.85*. There are more details about *d* in the next section. Also *C(A)* is defined as the number of links going out of page A. The PageRank of a page A is given as follows:

$$PR(A) = (1 - d) + d \cdot \left(\frac{PR(T1)}{C(T1)} + \dots + \frac{PR(Tn)}{C(Tn)} \right)$$



Remarks

"Note that the PageRanks form a probability distribution over web pages, so the sum of all web pages' PageRanks will be one.

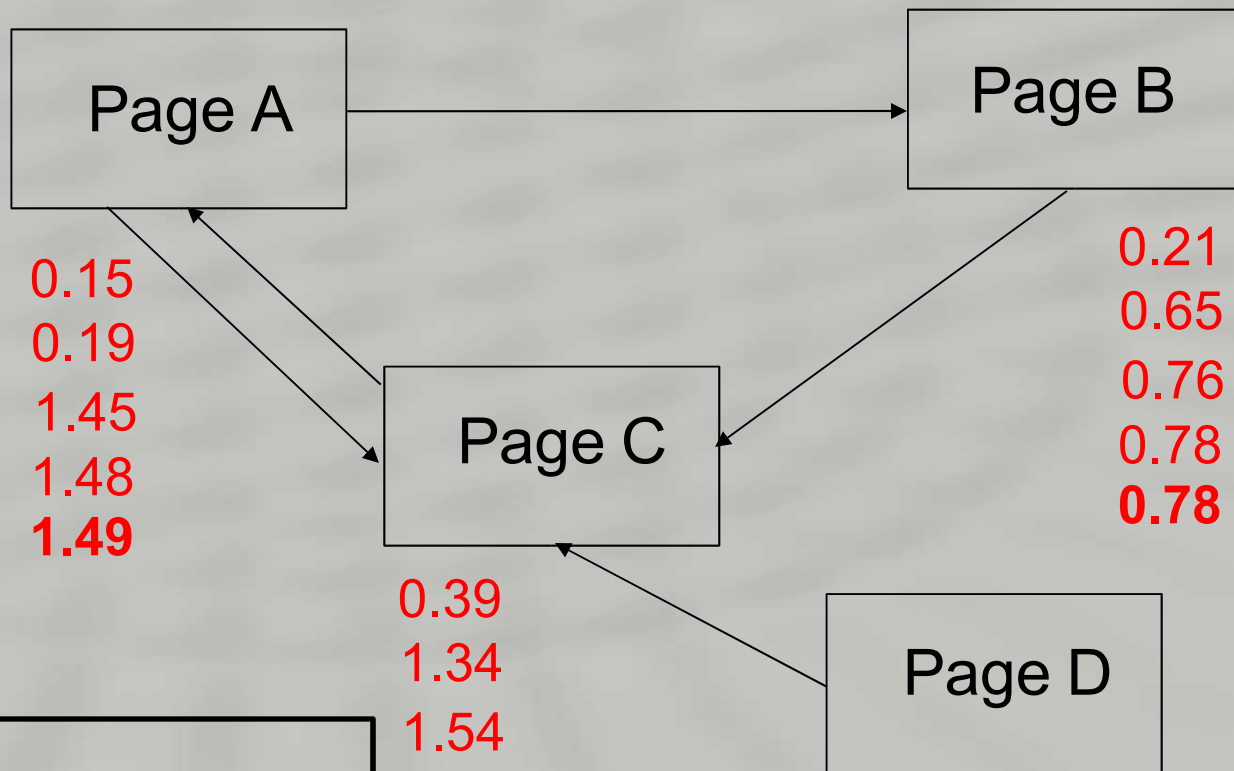
PageRank or $PR(A)$ can be calculated using a simple iterative algorithm, and corresponds to the principal eigenvector of the normalized link matrix of the web.

Also, a PageRank for 26 million web pages can be computed in a few hours on a medium size workstation."



Simple Example

K = 1
K = 5
K = 10
K = 20
K = 40



0.15
 0.19
 1.45
 1.48
1.49

0.21
 0.65
 0.76
 0.78
0.78

0.39
 1.34
 1.54
 1.57
1.57

0.15
 0.15
 0.15
 0.15
0.15

```

for k=1 .. 40 {
  $a = 1 - $damp + $damp * $c;
  $b = 1 - $damp + $damp * ($a/2);
  $c = 1 - $damp + $damp * ($a/2 + $b + $d);
  $d = 1 - $damp;
}
  
```



Remarks

- Converged relatively quickly
- Algorithm not complicated
- Average PageRank = 1.0 in a „close system”

$$\text{PR}(A) = 1.49$$

$$\text{PR}(B) = 0.78$$

$$\text{PR}(C) = 1.57$$

$$\text{PR}(D) = 0.15$$

$$3.99 / 4 \cong 1.0$$



PageRank in Math-Net

- ZIB data as trial set
 - 27,000 Documents from Harvest system
 - Per Document
 - URL
 - URL-References
 - other attributs (metadata)
 - URL normalization
 - Negligence of external links
 - 30 seconds for $k=20$ (perl script)



Result

- Search for Groetschel
 - Homepage takes rank 1 out of 799 (!)
 - Harvest ranking algorithm yields rank 53
- However, Google (for sure) does not suffice:
 - Search for Deuflhard produce: rank 6 out of 725
 - Harvest ranking algorithm yields rank 1
- Combination of both computations:
 - Both are rank 1



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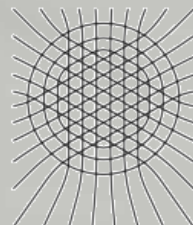
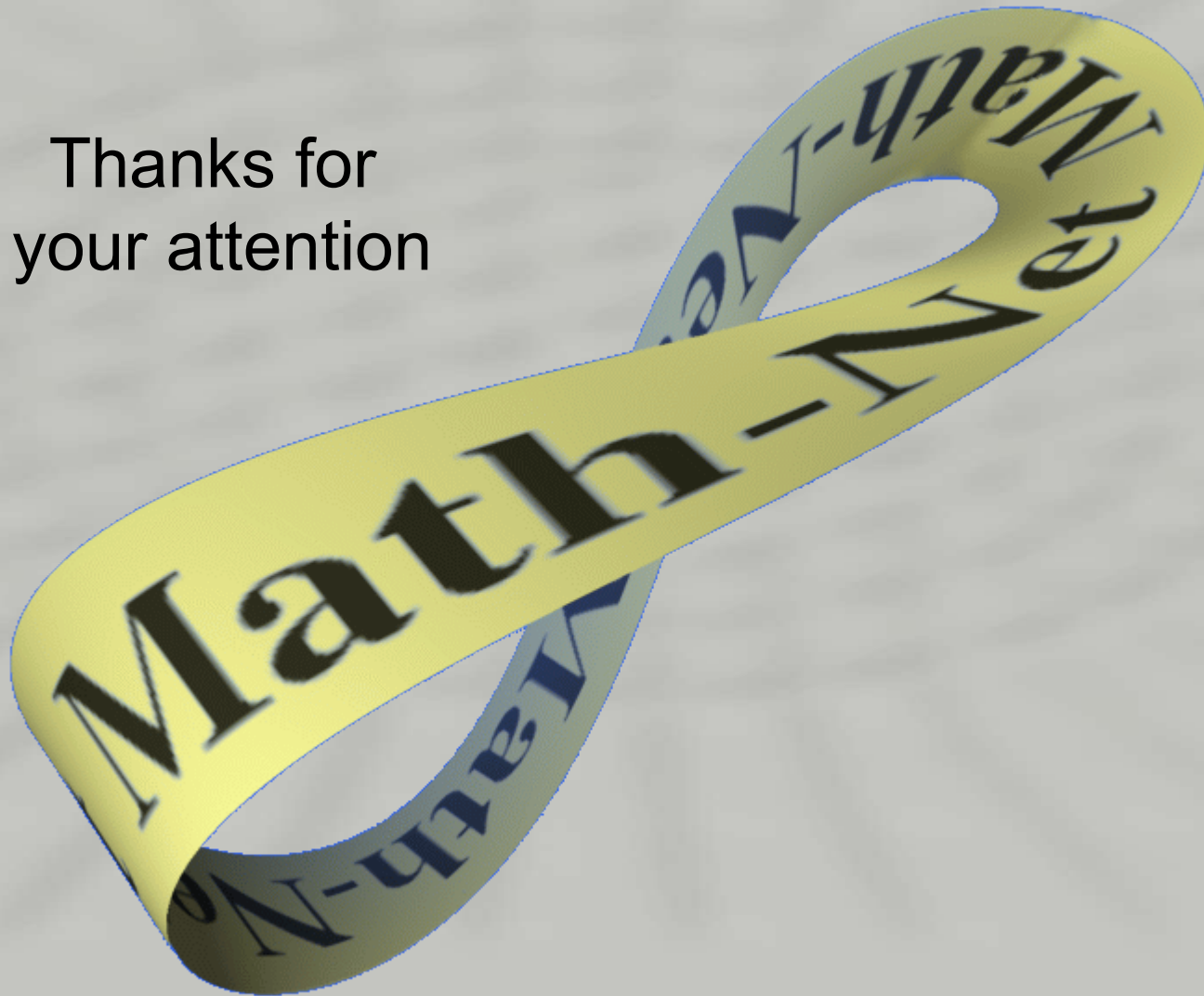


Outlook

- Serious Question: Is Google enough?
- Still a task to do:
 - Preparation
 - Organization
 - Search/Retrieval
- Resultset shown as a cluster



Thanks for
your attention



ZIB

URLs

- IMU server
 - www.mathunion.org
- IMU-Net
 - www.mathunion.org/IMU-Net
- EWDM
 - www.mathunion.org/ewdm
- Professional Homepages and EWDM
 - www.mathunion.org/MPH-EWDM
- Ian Rogers: The Google Pagerank Algorithm ...
 - www.iprcom.com/papers/pagerank/index.html
- S. Brin, L. Page: The Anatomy of a Large-Scale Hypertextual Web Search Engine
 - www-db.stanford.edu/~backrub/google.html

