STANDARD AND CUSTOM APIS FOR MATHEMATICAL INFORMATION RETRIEVAL
OAI-PMH API

- OAI = Open Archives Initiative
  - community of providers of preprint and fulltext repositories
OAI-PMH API

- OAI = Open Archives Initiative
  - community of providers of preprint and fulltext repositories
- PMH = Protocol for Metadata Harvesting
  - metadata only (no fulltexts)
WHAT DOES IT DO?

• "harvesting" =
  ▪ get all records
  ▪ get incremental updates
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- "records" = metadata only!
WHAT DOES IT DO?

- "harvesting" =
  - get all records
  - get incremental updates
- "records" = metadata only!
- filter by "sets"
  - in our case: filter by (top-level) MSC
WIDELY SUPPORTED

- supported by many repository providers
  - arXiv
  - Centre Mersenne
  - EuDML
  - DSpace
  - > 5,000 more (journals, university repositories, ...)
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  - arXiv
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  - DSpace
  - > 5,000 more (journals, university repositories, ...)
- all major programming languages provide client libraries for use in scripts
  - automatically takes care of pagination, rate limiting, encoding/decoding, ...
METADATA FORMATS

Metadata can be provided in several formats (all XML-based):
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- Dublin Core (DC)
  - restricted set of metadata (greatest common divisor)
  - every repository provider **must** support this
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- Dublin Core (DC)
  - restricted set of metadata (greatest common divisor)
  - every repository provider **must** support this
- custom formats
  - zb_preview in our case (see below)
The finiteness theorem for invariants of finite groups.
The finiteness theorem for invariants of finite groups.

13A50

dc:subject

dc:publisher

Springer, Berlin/Heidelberg

dc:date

1915

dc:creator

Noether, E.

dc:contributor

Meyer, Prof. (Königsberg i. Pr.)

dc:rights

...

dc:language

German

dc:identifier

2615555

dc:source


dc:relation

https://zbmath.org/02615555

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dc:title

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dc:type

j
The finiteness theorem for invariants of finite groups.
Example (DC)

```xml
<?xml version="1.0" encoding="utf-8"?>
<OAI-PMH>
  <responseDate>2021-06-17T07:21:28Z</responseDate>
  <GetRecord>
    <record>
      <header>
        <identifier>oai:zbmath.org:2615555</identifier>
        <datestamp>0001-01-01T00:00:00</datestamp>
        <setSpec>13</setSpec>
        <setSpec>JFM</setSpec>
      </header>
      <metadata>
        <oai_dc>
          <dc:contributor>Meyer, Prof. (Königsberg i. Pr.)</dc:contributor>
          <dc:creator>Noether, E.</dc:creator>
          <dc:date>1915</dc:date>
          <dc:identifier>2615555</dc:identifier>
          <dc:language>German</dc:language>
          <dc:publisher>Springer, Berlin/Heidelberg</dc:publisher>
          <dc:rights>...</dc:rights>
          <dc:subject>13A50</dc:subject>
          <dc:title>The finiteness theorem for invariants of finite groups.</dc:title>
          <dc:type>13A50</dc:type>
        </oai_dc>
      </metadata>
    </record>
  </GetRecord>
</OAI-PMH>
```
HUMAN-FRIENDLY INTERFACE

- familiarization
- exploration
- testing
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USAGE

- not all zbMATH Open data contained
- partially due to publishers' restrictions
- some also due to missing rights
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USAGE RESTRICTIONS

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available at oai.zbmath.org
CUSTOM OAI-PMH METADATA FORMAT

- better structure
  - closer aligned to zbMATH internal structure
CUSTOM OAI-PMH METADATA FORMAT

- better structure
  - closer aligned to zbMATH internal structure
- additional content
  - author disambiguation
  - reviews
  - references
  - classification
  - external links
The finiteness theorem for invariants of finite groups.


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10.1007/BF01456821
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M. Ann. 77, 89-92 (1915).


13A50

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REMAINING PROBLEMS

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- not all data contained
- no standardized tools
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- no standardized tools
- only simple filtering
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solved by custom API
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- filtering and sorting options
- smart search capabilities
  - rank results by relevance
  - find similar articles
  - "did you mean?"
Envision possibility for users to add data:
Envision possibility for users to add data:

- author disambiguation
Envision possibility for users to add data:

- author disambiguation
- affiliations
Envision possibility for users to add data:

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- external IDs/Links
- pingbacks, mentions, events

**DATA INPUT**

*Miller, Michael J.*

On Sendov's conjecture for roots near the unit circle. (English)  

The well known Iliev-Sendov conjecture states that, if $P$ is a polynomial with complex coefficients all of whose zeros lie in the unit disk then every disk of radius 1 with centre a zero of $P$ contains a zero of $P'$. This has now been settled in general only for polynomials of degree $\leq 6$ [E. S. Katsoprinakis, Bull. Lond. Math. Soc. 24, 449-455 (1992)], and for those with at most 5 distinct zeros [S. Kumar and B. G. Shenoy, J. Math. Anal. Appl. 171, 595-600 (1992; Zbl 0773.30004)]. Here the author considers the class $S(n, \beta)$ of polynomials of degree $n$ with all roots in the unit disk and at least one zero at $\beta$. He denotes by $\left| P_\beta \right|$ the distance between $\beta$ and the nearest root of $P'$. He proves that there are constants $K_n$ with $K_n \to 1/3$ such that if $\beta$ is sufficiently close to 1 and $P \in S(n+1, \beta)$, then $\left| P_\beta \right| \leq 1 - K_n (1 - \beta)$. Thus the Iliev-Sendov conjecture is true in a rather strong sense for roots sufficiently close to the unit circle.

Reviewer: D.W. Boyd (Vancouver)

**MSC:**

30C15 Zeros of polynomials, rational functions, and other analytic functions of one complex variable  
(e.g., zeros of functions with bounded Dirichlet integral)

30C10 Polynomials and rational functions of one complex variable

**MathOverflow Questions:**

Local optimum for Sendov's conjecture

**Keywords:**

critical points; Iliev-Sendov conjecture
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- more?
Data Input

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- more?
- needs authorization or monitoring
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  ▪ no warranties for availability, suitability for a specific purpose, etc.
  ▪ but we do our best
THANK YOU!
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QUESTIONS?