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DOCTORAL DISSERTATIONS IN NCD VIRTUAL LIBRARY

Abstract: We present the collection of digital copies of doctoral dissertations which is a part of the Virtual Library (<http://elibrary.matf.bg.ac.rs>) of the Faculty of Mathematics of the University in Belgrade. The library is operated under the supervision of NCD (National Center for Digitization). Metadata associated to this collection are also proposed.

Introduction

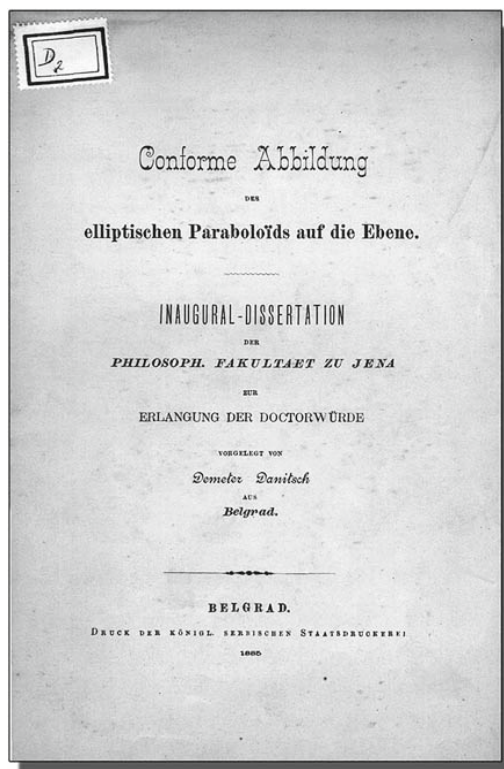
One of the aims of the current digitization project *Applications of information technologies in digitization of the scientific and cultural heritage* is to build the digital depositary of all Serbian doctoral dissertations in mathematical sciences. The project is financed by the Serbian Ministry of Science and Technological Development. It started in April 2008, and since then, about 360 doctoral dissertations were digitized. The dissertations are coming from all areas of the mathematical sciences: mathematics, astronomy, mechanics and computer science. Most of the digitized dissertations were obtained at the Belgrade University and the collection contains most of these dissertations defended since the University was founded in 1905. There are a few dissertations obtained at the other Serbian universities and several theses of Serbian mathematicians who live and work in Diaspora. The collection is a part of the Virtual Library <http://elibrary.matf.bg.ac.rs>. Dissertations, as well as all digitized books contained in this library, can be freely downloaded.

Collection of doctoral dissertations

The collection contains all doctoral dissertations of Serbian mathematicians written before the First World War (8), including the oldest one (see figure): Dimitrije Danić, *Conforme Abbildung des Elliptischen Paraboloids auf die Ebene*, Inauguration dissertation der Philosoph. Fakultät zu Jena, printed in Belgrade, 1885.

Some of these theses were translated and whenever it was possible, the related documentation (biographies, archive materials, etc.) was also digitized and included in the presentation. The Internet presentation of retro-digitized books, theses and manuscripts can be also found at <http://elib.matf.bg.ac.rs:8080/virlib/>. At the same address, part of the presentation/database contains more or less recent (published and unpublished) doctoral and master theses defended at the Faculty of Mathematics in Belgrade. The Council of the Faculty of mathematics decided in 2007 that all submitted theses must be given also in the digital

form, so we expect that this part of the database will grow significantly in the next period. Our future plans are:



- To digitize and include into the existing collection all Serbian doctoral dissertations. This is not an easy task, as the hard copies of certain theses have been lost. Secondly, the number of Serbian doctoral dissertations is large. Only at the University of Belgrade more than 18000 dissertations were defended. Our estimation is that at this moment the number of all Serbian doctoral dissertations is about 25000. Thirdly, this project is expensive. Our estimation is that the cost of whole process of digitization, including labor, equipment and software development, is about 30-40 EUR per one thesis.

- On the SEEDI (*South-Eastern European Digitization Initiative*) meeting held in 2007 in Cetinje, Montenegro, the idea to establish cooperation in this project between partners involved in SEEDI was supported. The existing database of Virtual Library gives a good opportunity to start the realization of this idea. The Virtual library may serve as a digital depository for this aim. The meeting of SEEDI organized in Sarajevo (2010)

was the good place for final modification and the acceptance of metadata for this collection.

- We are planning also to interconnect our collection with similar collections and database in the world. In particular, it would be very interesting to connect the collection of mathematical doctoral dissertations contained in the Virtual Library with the Mathematics Genealogy Project, <http://genealogy.math.ndsu.nodak.edu>.

Of course, there are many issues to resolve such as metadata for such collections and copy-right questions related to our database and the use of doctoral dissertations deposited there. In this paper we propose the list of metadata for digitized doctoral dissertations.

Metadata

The new version of Virtual Library is operating under DSpace, open-source software released by MIT for archiving e-prints and other kinds of academic content. This software sustains Dublin Core standard, for overview of included elements see the site on the Internet address: <http://www.scribd.com/doc/15284184/Dspace-Dublin-Core-elements-Overview>.

Doctoral dissertation metadata

The elements prefixed by **dc** are predefined in DSpace. However, we included a set of new elements, prefixed by **mf** in order give more information about the theses and the authors. The set of elements is compatible with the recommendation for the national standard for describing digitised heritage in Serbia (for more information see: Zoran Ognjanović, Tamara Butigan, Bojan Marinković, NCD Recommendation for the National Standard for Describing Digitised Heritage in Serbia, in: *Metadata and Semantics*, eds: M.-A. Sicilia, M. D. Lytras, Springer, 45-54, 2009. ISBN: 978-0-387-77744-3). Our proposal of metadata is as follows.

Data that should be supplied by the author of the thesis

Field	Description
dc.contributor.advisor:	The name of the thesis adviser.
dc.contributor.author:	The name of the author of the dissertation.
dc.date.issued:	The year when the thesis was defended.
dc.description.abstract:	The abstract of the thesis.
dc.publisher:	The (geographical) place where the thesis was obtained.
dc.title:	The title of the thesis (translated in English).
dc.title.alternative:	The alternative title of the thesis.
mf.author.middle:	The middle name of the author.
mf.author.birth-date:	The birth year of the author.
mf.author.birth-place:	The birth place of the author.
mf.author.birth-country:	The country of birth of the author.
mf.author.residence-state:	The residence of the author at the time when the thesis was obtained.
mf.author.citizenship:	The author's citizenship.
mf.author.nationality:	The author's nationality.
mf.title.original:	The title of the thesis in the original language (in which it was written).
mf.abstract.original	The original abstract of the thesis
mf.subject.area:	The scientific field of the thesis.
mf.subject.keywords:	Keywords related to the thesis.
mf.subject.subarea:	The first scientific subfield of the thesis.
mf.subject.subarea:	The second scientific subfield of the thesis.
mf.subject.msc:	Mathematical Subject Classification.
mf.subject.udc.:	Universal Decimal Classification.
mf.contributor.committee:	Thesis committee
mf.university.original:	University where the thesis was obtained (original name).
mf.university.en:	University where the thesis was obtained (in English).
mf.faculty.original:	Faculty (department) where the thesis was obtained (original name).
mf.faculty.en:	Faculty (department) where the thesis was obtained (in English).
mf.document.references:	Number of references (bibliography) in the thesis.
mf.document.pages:	Number of pages in the thesis.
mf.document.location:	Location (library) where the hard copy of the thesis can be found.
mf.document.location:	The second location where the hard copy of the thesis can be found.
mf.document.genealogy-project:	YES if the thesis is presented in the Mathematics Genealogy Project, www.genealogy.ams.org .
mf.format.resolution:	scanning resolution (DPI).
mf.decription.original	Review of the thesis (original language)
mf.decription.en	Review of the thesis (in English)
mf.history.original	History of the thesis (original language)
mf.history.en	History of the thesis (in English)
mf.related_links	Links related to the thesis
mf.note.original	Note (in the original language)
mf.note.en	Note (in English)

Machine generated data:

dc.date.accessioned:	Date when the thesis was uploaded into the database.
dc.date.available:	Date since the thesis was available to the general public.

dc.identifier.uri:	Uri address of the digital copy of the thesis.
dc.description.provenance:	A description of any changes in ownership and custody of the resource that are significant for its authenticity, integrity, and interpretation.
dc.format.extent:	The size or duration of the resource.

Example

The next excerpt from Virtual Library illustrates metadata and data associated to a doctoral dissertation in mathematics.

dc.contributor.advisor	Prešić, Slaviša	
dc.contributor.author	Marković, Marko	en_US
dc.date.accessioned	2009-12-03T12:14:50Z	
dc.date.available	2009-12-03T12:14:50Z	
dc.date.issued	1977	en_US
dc.identifier.uri	http://hdl.handle.net/123456789/196	
dc.description.abstract	Part1. Basic notions of model theory are given. Part2. Dual notions in categories of Boolean algebras and Stone spaces are studied in respect to natural contra-variant functor. The cellularity number of a Boolean algebra B, celB is studied, certain cardinal properties are proved, e.g. it is consistent with ZFC that celB is attained for every Boolean algebra B.	en
dc.description.provenance	Made available in DSpace on 2009-12-03T12:14:50Z (GMT). No. of bitstreams: 1 phdZarkoMijajlovic.pdf: 27390423 bytes, checksum: 5b828c388c5ebc07e988e80dce9212c9 (MD5) Previous issue date: 1977	en
dc.format.extent	158	
dc.publisher	Belgrade	en_US
dc.title	A Contribution to Model Theory and Boolean Algebras	en_US
dc.title.alternative	Prilog teoriji modela i Booleovih algebri	sr
mf.author.middle	Dušan	
mf.author.birth-date	1948	
mf.author.birth-place	Prokuplje	
mf.author.birth-country	Yugoslavia	
mf.author.residence-state	Serbia	
mf.author.citizenship	Serbian	
mf.author.nationality	Serbian	
mf.title.original	Prilog teoriji modela i Booleovih algebri	
mf.subject.area	Mathematics	
mf.subject.keywords	model theory, Boolean algebras, Lindenbaum algebras, type, elimination of quantifiers, model completion, atomless, absolutness, Levy hierarchy	
mf.subject.subarea	Algebra - Boolean algebras	
mf.subject.subarea	Mathematical logic - Model theory	
mf.subject.msc	03C10, 03C52, 03G05	
mf.contributor.committee	Kurepa, Đuro; Prešić, Slaviša; Alimpić, Branka	
mf.university.en	University of Belgrade	
mf.faculty.en	Faculty of Science and mathematics	
mf.document.references	43	
mf.document.pages	VI + 158	
mf.document.location	Faculty of Mathematics, University of Belgrade, Serbia	
mf.document.location	Library of the University of Belgrade, Serbia	
mf.document.genealogy-project	Yes	
mf.format.resolution	300 DPI	