UNIVERSITY OF KRAGUJEVAC
FACULTY OF SCIENCE

Analysis
Approximation
Applications

JUNE 21-24 VRNJAČKA BANJA

INTERNATIONAL MATHEMATICAL CONFERENCE

BOOK OF ABSTRACTS

2023

Analysis Approximation Applications

UNIVERSITY OF KRAGUJEVAC
FACULTY OF SCIENCE

INTERNATIONAL MATHEMATICAL CONFERENCE
ANALYSIS, APPROXIMATIONS AND APPLICATIONS
(AAA2023)

Dedicated to Academician Gradimir V. Milovanović on the occasion of his 75th anniversary

BOOK OF ABSTRACTS

June 21–24, 2023
Vrnjačka Banja, Serbia

CIP - Каталогизација у публикацији Народна библиотека Србије, Београд

517.5(048)

INTERNATIONAL Mathematical Conference Analysis, Approximations and Applications (2023 ; Vrnjačka Banja)

Book of Abstracts / International Mathematical Conference Analysis, Approximations and Applications (AAA2023), June 21–24, 2023 Vrnjačka Banja, Serbia ; [edited by Aleksandra Milosavljević]. - Kragujevac : Faculty of Science University, 2023 (Niš : Grafika Galeb). - 103 str. ; 25 cm

Tiraž 100. - Bibliografija uz pojedine apstrakte. - Registar.

ISBN 978-86-6009-094-4

a) Теорија функција -- Апстракти

COBISS.SR-ID 118020873

Book of Abstracts
International Mathematical Conference
Analysis, Approximations and Applications (AAA2023)
June 21–24, 2023
Vrnjačka Banja, Serbia
https://imi.pmf.kg.ac.rs/aaa2023/
ISBN 978-86-6009-094-4

Published By:
Faculty of Science
University of Kragujevac
Radoja Domanovića 12
34000 Kragujevac
Serbia
Tel.: +381 (0)34 336223
Fax: +381 (0)34 335040
Website: http://pmf.kg.ac.rs

For publisher: Prof. Dr. Marija Stanić, dean
Edited By: Aleksandra Milosavljević
Front Cover: Ivan Đorđević
Printed By: Grafika Galeb DOO, Niš, Serbia
Circulation: 100

Year of Publication: 2023

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University of Kragujevac

The *Faculty of Science* in Kragujevac was established as a branch of the Faculty of Science in Belgrade on October 16th 1972. On April 15th 1976, the branch evolved into an independent Faculty which, by merging with five other faculties and two institutes, became one of the founders of the University "Svetozar Marković", today the *University of Kragujevac*. The Faculty comprises the following organizational units:

- Department of Mathematics and Informatics,
- Department of Biology and Ecology,
- Department of Physics,
- Department of Chemistry,
- Chair of General Education Courses,
- Secretariat.

The faculty offers degrees at all three levels of study - Bachelor's, Master's, and Doctorate degrees. For 51 years, following both the development of science and education and the demands of labour market, we have been developing teaching excellence concurrently with the courses offered, and the value of our Faculty may be shown as the outcomes of our alumni who build their successful careers both here and around the world. The academic staff includes 134 teachers and teaching assistants, 100 of whom hold doctorates. This year, 1401 students are studying at the faculty at all degree levels, 117 of whom are doctoral students. Every year, we publish about 200 scientific papers in the most respected international scientific journals. Our faculty has gained a reputation in scientific research due to:

- numerous scientific projects,
- prestigious international scientific journal **MATCH** - *Communications in Mathematical and in Computer Chemistry* (In 2021, MATCH impact factor was 2.633.),
- editions of international monographs Mathematical Chemistry Monographs,

and two national scientific journals:

- *Kragujevac Journal of Mathematics*, and
- *Kragujevac Journal of Science.*

Teachers and associates of Faculty are also the authors of the wide array of monographs and textbooks. Apart from the Academic Departments, The Faculty of Science also encompasses two separate units that are both classrooms for our students and places for our fellow citizens and tourists to visit:

- Aquarium
- Botanical Garden.

We have established international scientific cooperation and, enhancing it further, we are dedicatedly engaged to promote science with all the surrounding countries: North Macedonia, Montenegro, Bosnia and Herzegovina, and Croatia. We have effective cooperation with Italy, Austria, Germany, Czech Republic, China, Spain, Turkey, Poland, Bulgaria, Hungary, Romania, France, Greece, the UK, Switzerland, Belgium, the USA, Egypt, Russia... Over 20 countries around the world! Our mission is to enable the highest academic standards and provide acquiring of distinguishably exceptional knowledge and skills through education, scientific research work and through participation in the development of academic and broader social community. Our vision is to make Faculty grow into modern European higher education institution recognized by both educational and scientific achievements and graduate students' accomplishments. Having been cherishing excellence in education and science, the Faculty tends to contribute not only to the change of comprehensive educational and economy ambience in Serbia but to the overall social development.

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HOST CITY – VRNJAČKA BANJA

Known from antiquity as the favorite destination of aristocracy, Vrnjačka Banja (eng. Vrnjacka spa) is a health resort in the heart of Serbia, popular nowadays for its springs of water with healthy features.

Vrnjačka Banja was named after the village of Vrnjci where mineral springs were first discovered. It is located in Central Serbia, 200 kilometers south from the city of Belgrade, at forested slopes of mountain Goč and in valleys of the Vrnjačka river and the Lipovačka river.

It has mild continental climate, and it has seven mineral springs, four of which are used for balneological therapy. History says that these mineral springs were discovered in ancient history at the time when this area was populated by the Celtic tribe Scordisci.

Based on archaeological findings, we can say that these springs were used in ancient times and at hot mineral spring in Vrnjačka Banja Romans built the health resort Aquae Orcinae, visited both by legionnaires and aristocracy. The remains of antique pools and terms are preserved to this day.

According to a legend, its healing powers were well known to the Turks as well, as it is known that Turkish sipahi came here looking for a piece of heaven. Local people covered the springs with dirt attempting to hide them.

The modern history of Vrnjačka Banja begins in 1868, when Pavle Mutavdžić, the district chief in Kruševac of the time, formed an appro-

Anti-Gaussian quadrature rules related to orthogonality on the semicircle

Aleksandra Milosavljević[1], Marija P. Stanić[1], Tatjana V. Tomović Mladenović[1]

[1]University of Kragujevac, Faculty of Science, Department of Mathematics and Informatics, aleksandra.milosavljevic@pmf.kg.ac.rs, marija.stanic@pmf.kg.ac.rs, tatjana.tomovic@pmf.kg.ac.rs

Let Γ be a unit semicircle $\Gamma = \{z = \mathrm{e}^{\mathrm{i}\theta} : 0 \leq \theta \leq \pi\}$. Orthogonal polynomials on the semicircle with respect to the complex-valued inner product

$$\langle f, g\rangle = \int_{\Gamma} f(z)g(z)(\mathrm{i}z)^{-1}\mathrm{d}z = \int_{0}^{\pi} f(\mathrm{e}^{\mathrm{i}\theta})g(\mathrm{e}^{\mathrm{i}\theta})\mathrm{d}\theta$$

was introduced by Gautschi and Milovanović in [1], were the certain basic properties were proved. Such orthogonality as well as the applications involving Gauss-Christoffel quadrature rules were further studied in [2] and [4]. In this article we introduce anti-Gaussian quadrature rules related to the orthogonality on the semicircle (see [1]) and present stable numerical method for their construction. Also, some numerical examples are included.

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