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**PARTICIPATION**

**Benderradji Razik**

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September in 2024 at Konya/Turkey

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*Statistical Analysis and Numerical Study for the Optimization of  
Magnetohydrodynamic (MHD) Mixed Convection in Ventilated  
Cavities Using Nanofluids*

**PRESENTATION TYPE**

*Oral*



*All Sciences Academy*

# ICAENS 2024



**6th International Conference on Applied Engineering and  
Natural Sciences ICAENS 2024**

September 25-26, 2024: Konya, Turkey

**Abstract Book**

# ABSTRACT BOOK OF 6TH INTERNATIONAL CONFERENCE ON APPLIED ENGINEERING AND NATURAL SCIENCES ICAENS 2024

## ABSTRACT BOOK OF 6TH ICAENS 2024:

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## INTRODUCTION

We had the great honor of organizing 6th International Conference on Applied Engineering and Natural Sciences ICAENS 2024. It was truly a great pleasure for us to greet a lot of participants from many different countries attending ICAENS 2024! We firmly believe that the conference will become an important international event in the field of cross-industry discussion about innovations in Academic Studies.

Three cooperating organizations supported the two-day conference. There were 301 papers accepted for presentation at ICAENS 2024, contributed from different countries. We had plenary speeches and several well-known scientists and experts, to give invited talks at different sessions.

The purpose of ICAENS 2024 was to provide a forum for the participants to report and review innovative ideas, with up-to-date progress and developments, and discuss novel approaches to the application in the field of their own research areas and discuss challenges of doing science.

We sincerely hope that the exchange of ideas on doing research, science and improving education will help the participants, and international cooperation sharing the common interest will be enhanced.

On behalf the Organization Committee of ICAENS 2024, we would like to heartily thank our cooperating organizations for all they have done for the conference. We would also like to thank the authors for their contribution to the proceedings; the participants and friends of ICAENS 2024, for their interest and efforts in helping us to make the conference possible; and the Editorial boards for their effective work and valuable advice, especially the ICAENS 2024 secretariat and the ICAENS 2024 staff, for their tireless efforts and outstanding services in preparing the conference and publishing the Proceedings.

Publisher: All Sciences Academy



## Statistical Analysis and Numerical Study for the Optimization of Magnetohydrodynamic (MHD) Mixed Convection in Ventilated Cavities Using Nanofluids

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**Abstract** – A numerical study was conducted to investigate mixed convection in a square ventilated cavity with a central cooling cylinder, aimed at evaluating heat exchange. The study used pure water and mixtures with Cu and Al<sub>2</sub>O<sub>3</sub> nanoparticles. The analysis covered a wide range of Richardson numbers ( $0.1 < Ri < 100$ ), Hartmann numbers ( $0 < Ha < 100$ ), and nanoparticle volume fractions ( $0\% < \phi < 8\%$ ), under the influence of a uniform external magnetic field. The governing non-dimensional equations and boundary conditions were solved using the finite volume method and the SIMPLER algorithm.

The study used Response Surface Methodology (RSM) to estimate the average Nusselt number ( $Nu_{avg}$ ) associated with mixed convection. Analysis of Variance (ANOVA) and the quadratic model from RSM showed high predictive accuracy, with an  $R^2$  close to 1. Results indicated that increasing Richardson number significantly boosts  $Nu_{avg}$ , while higher nanoparticle volume fractions slightly reduce it.

Nanofluid flow was highly influenced by the magnetic field, with higher Richardson and Hartmann numbers improving thermal properties. Although adding nanoparticles generally enhanced heat transfer, their impact became less significant with increasing Hartmann numbers. The results were also analyzed in terms of thermal and hydrodynamic fields, along with velocity profiles, and heat exchange on the active wall was measured through  $Nu_{avg}$  calculation.

**Keywords** – Magnetic field, Mixed convection, nanofluid, ventilated square cavity, Heat transfer.



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**6TH INTERNATIONAL CONFERENCE  
ON APPLIED ENGINEERING AND  
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SEPTEMBER 25-26, 2024**

**04.10.2024**

25-26 Eylül 2024 tarihlerinde MEET üzerinden çevrimiçi olarak gerçekleştirilen 6th International Conference on Applied Engineering and Natural Sciences ICAENS 2024 konferansı akademik teşvik yönetmeliğinin 9. Maddesine istinaden “Tebliğlerin sunulduğu yurt içinde veya yurt dışındaki etkinliğin uluslararası olarak nitelendirilebilmesi için Türkiye dışında en az beş farklı ülkeden sözlü tebliğ sunan konuşmacının katılım sağlaması ve tebliğlerin yarıdan fazlasının Türkiye dışından katılımcılar tarafından sunulması esastır.” kriterlerini sağlamaktadır. Toplam 301 adet bildirinin yer aldığı kongre iki gün boyunca çevrimiçi olarak gerçekleştirilmiştir.

Türkiye dışından toplam 23 farklı ülkeden (Fas, Cezayir, Tunus, Suudi Arabistan, Litvanya, Irak, Azerbaycan, Birleşik Krallık, Pakistan, Malezya, Kosova, Çin, Nijerya, Brezilya, Portekiz, Hindistan, Arnavutluk, Macaristan, Fransa, Rusya, Sırbistan, Polonya, İtalya) katılım sağlanmış olup, 301 adet bildirinin 171 (%56,81) tanesi yabancı katılımcı tarafından sunulmuştur.

*Kongremize ilginiz için teşekkür ederiz.*

*Saygılarımızla,*



*All Sciences Academy*

**6TH INTERNATIONAL CONFERENCE  
ON APPLIED ENGINEERING AND  
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25-26 Eylül 2024 tarihlerinde MEET üzerinden çevrimiçi olarak gerçekleştirilen 6th International Conference on Applied Engineering and Natural Sciences ICAENS 2024 konferansı MART DÖNEMİ DOÇENTLİK BAŞVURU ŞARTLARI yönetmeliğinin 2. bölümde yer alan Uluslararası Bilimsel Toplantı tanımlaması “Farklı ülkelerden bilim insanlarının bilim kurulunda bulunduğu ve sunumların bilimsel ön incelemeden geçirilerek kabul edildiği toplantı.” şeklindedir.

6TH ICAENS 2024 konferansı bilimsel komitesinin çoğunluğu yabancı bilim insanlarından oluşmaktadır. Aşağıdaki link ile bilimsel komite incelenebilir:

<https://www.icaens.org/com>

Ayrıca konferansımızda hakem değerlendirmesi olup hakem değerlendirmesi olumlu sonuçlanmadan ücret talebinde bulunulmamaktadır.

2024 MART DÖNEMİ DOÇENTLİK BAŞVURU ŞARTLARI yönetmeliğinin 8. bölümde yer alan Bilimsel Toplantı tanımlamasının b bendindeki “Diğer Uluslararası/Ulusal bilimsel toplantının düzenlenme komitesinde, kurum/tüzel kişilik/karar organı tarafından resmi olarak görevlendirilmiş üniversite/enstitü/bilimsel kurum/branş derneği akademisyen temsilcisi bulunması zorunludur.” şeklindedir.

6TH ICAENS 2024 konferansı düzenleme komitesinde farklı kurumlar tarafından görevlendirilmiş birden fazla üniversiteden akademik temsilciler bulunmaktadır. Aşağıdaki link ile düzenleme komitesindeki akademik temsilcilerin görevlendirme yazıları incelenebilir:



<https://drive.google.com/file/d/1eZalxRl8q6-eXATZzwUraH9KOhtQzFho/view>

Ayrıca görevlendirme yazıları ilgili konferansın özet ve tam metin kitapçıklarında yer almaktadır.

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We confirm that Ing. Ondrej Takáč, PhD. working at J. Selye University takes part in the organization committee of the conferences organized by of All Sciences Academy.

### Confirmation of the Vice Dean of the Faculty of Economics and Informatics

Name of Responsible Person and Signature:

Name and Surname

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PhDr. Imrich Antalík, PhD.

Date: 04.09.2023

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04.09.2023

## LETTER OF ASSIGNMENT

We confirm that PaedDr. Ladislav Végh, PhD. working at J. Selye University takes part in the organization committee of the conferences organized by of All Sciences Academy.

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16.08.2023

## LETTER OF ASSIGNMENT

We confirm that Prof. Assoc. Dr. Admir Jançe, who is employed full-time as a lecturer, as well as holding the position of Head of the Imaging Department and Vice Dean of the Faculty of Technical Medical Sciences, takes part in the organization committee of the conferences organized by of All Sciences Academy.

### Confirmation of the Rector/Dean/Vice Dean/Head of Department

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Rector: Prof. Dr. Tonin GJURAJ



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Date: 16.08.2023

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Ad ve Soyad

Prof. Dr. Adem YILMAZ

Dekan

Tarih 15.09.2023

İmza:

Prof.Dr. Adem YILMAZ  
DEKAN



15.09.2023

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Dekan  
Tarih 15.09.2023

İmza:

  
Prof.Dr. Adem YILMAZ  
DEKAN





04.09.2023

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### Confirmation of the Vice Dean of the Faculty of Economics and Informatics

Name of Responsible Person and Signature:

Name and Surname

Sign:

PhDr. Imrich Antalík, PhD.

Date: 04.09.2023

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01.11.2023

İLGİLİ MAKAMA

İlgi : Öğretim Üyesi Doç. Dr. Nermin KİŞİ'nin 30.10.2023 tarihli dilekçesi.

Yüksekokulumuz Yönetim ve Organizasyon Bölümü Öğretim Üyesi Doç. Dr. Nermin KİŞİ'nin "All Sciences Academy Yayınevi"nin düzenleyeceği bilimsel toplantıların düzenleme ve bilim kurullarında görev almasında Yüksekokulumuzca bir sakınca bulunmamaktadır. İş bu belge ilgilinin isteği üzerine tanzim edilmiştir.

Bilgilerinizi ve gereğini rica/arz ederim.

Doç. Dr. Hikmet YAZICI  
Meslek Yüksekokulu Müdürü

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