



Kareem Elgindy

Curriculum Vitae

"I have always had a deep passion for teaching and research throughout my whole life" - Kareem Elgindy

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2 Biographical Statement

I am an Egyptian citizen born in the city of Assiut on the 4th of June 1983. I joined Assiut University in Egypt in 2000, where I received my bachelor's degree in mathematics (first-class honors) in 2004. Inspired by the works of Dr. Salah El-Gendi in numerical analysis and my father, Dr. Taha Elgindy, in optimal control theory, I decided in my early career to work in these research areas. I obtained a master's degree in scientific computations in 2008 from the Mathematics Department, Faculty of Science, Assiut University. I then gained a PhD in Applied and Computational Mathematics from Monash University in Melbourne, Australia, in June 2013. I was granted the title of Visiting Scholar at the California Institute of Technology (Caltech) in 2016 after I received the AY2016-2017 Fulbright Egyptian Visiting Scholar Award. I was an Associate Professor in the Mathematics Department, College of Computing and Mathematics in King Fahd University of Petroleum & Minerals (KFUPM) in KSA, and a member of the Interdisciplinary Research Centre for Membranes and Water Security (IRC-MWS) in KFUPM from 2017 to 2022. I was also an Associate Professor in the Mathematics Department, School of Mathematics and Physics at Xiamen University Malaysia (XMUM) from September 2023 to August 2024. I have been an Associate Professor in the Mathematics Department, Faculty of Science, Assiut University in Egypt since June 2019. Currently, I am an Associate Professor in the Department of Mathematics and Sciences, College of Humanities and Sciences at Ajman University (AU), UAE, since August 2024. I am also an Editor of International Journal of Mathematics and Mathematical Sciences (Current Impact Factor 1). My current research interests include numerical analysis, (fractional) optimal control theory, (fractional) partial differential equations, mathematical biology, and nonlinear programming.

3 Education

Higher Education

Aug. 2009–Jun. 2013 **Ph.D. in Applied and Computational Mathematics**, *School of Mathematical Sciences, Monash University, Melbourne, Victoria, Australia.*

Dissertation Title "Gegenbauer Collocation Integration Methods: Advances in Computational Optimal Control Theory."

Supervisors Kate A. Smith-Miles; Boris Miller.

The dissertation was nominated for the 2013 Mollie Holman Doctoral Medal and deemed very impressive by the Graduate Research Committee.

[An e-copy of the dissertation is available from this link.](#)

Sep. 2005–Nov. 2008 **M.Sc. in Scientific Computations**, *Mathematics Department, Faculty of Science, Assiut University, Assiut, Egypt.*

Dissertation Title "Chebyshev Approximation for Solving Differential Equations, Integral Equations, and Nonlinear Programming Problems."

Supervisors Salah E. El-Gendi, Hassan M. El-Hawary; Abdel Rahman H. Abdel Rahman.

Passed the courses in partial fulfillment of my M.Sc. degree with general grade "Excellent" (percentage 93%).

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Sep. **B.Sc. in Mathematics (First Class Honours)**, *Mathematics Department, Faculty of Science, Assiut University, Assiut, Egypt.*
2000–Jul. 2004

Passed the courses in fulfillment of my B.Sc. degree with general grade “Distinction with Honor” (percentage 93.543%).

I was the top student in the total grade among all the graduates of the Faculty of Science since its establishment in 1957, and the third among all the graduates of the University.

Secondary Education

1999–2000 **General Secondary Education**, *Al Gamaa Secondary School, Assiut, Egypt.*
Total Score 395/410 (percentage 96.34%).

4 Specialization

Applied and Computational Mathematics.

5 Research Interests

- (Fractional) Optimal Control Theory; (Fractional) PDEs; Numerical Analysis; Mathematical Biology; Nonlinear Programming.

6 Past and Current Research

- Adaptive discontinuous Galerkin methods.
- Adaptive spectral element methods.
- Direct optimization methods.
- Exact line search methods.
- Fourier-based numerical methods.
- Improving the current water security technology for cleansing drinking water.
- Mesh refinement methods for solving optimal control problems.
- Numerical solution of fractional optimal control problems.
- Numerical solution of fractional PDEs.
- Numerical solution of infinite-horizon optimal control problems.
- Numerical solution of nonlinear differential equations.
- Numerical solution of nonlinear integral equations.
- Numerical solution of nonlinear integro-differential equations.
- Numerical solution of nonlinear PDEs.
- Numerical solution of nonlinear periodic optimal control problems.
- Numerical solution of PDEs in complex domains.
- Numerical solution of nonlinear PDE-based optimal control problems.
- Numerical solution of singularly perturbed differential equations.
- Optimizing the performance of chemostats through predictor-corrector schemes.
- Predictor-corrector methods for solving nonsmooth optimal control problems.
- Spectral and pseudospectral methods.
- Trajectory planning and endurance maximization of unmanned aerial vehicles.

7 Academic Employment

August 2024–Present **Associate Professor**, *AU, Ajman, UAE.*

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- June 2019–Present **Associate Professor–tenure-track**, *Assiut University*, Assiut, Egypt.
- September 2023–August 2024 **Associate Professor**, *XMUM*, Sepang, Malaysia.
- July 2022–December 2022 **Member of Interdisciplinary Research Center for Membranes and Water Security (IRC-MWS)**, *KFUPM*, Dhahran, KSA.
- April 2022–December 2022 **Associate Professor–tenure-track**, *KFUPM*, Dhahran, KSA.
- August 2017–March 2022 **Assistant Professor–tenure-track**, *KFUPM*, Dhahran, KSA.
- November 2013– May 2019 **Assistant Professor–tenure-track**, *Assiut University*, Assiut, Egypt.
- August 2011–June 2013 **Teaching Associate**, *Monash University*, Melbourne, Victoria, Australia.
- December 2008–October 2013 **Assistant Lecturer–tenure-track**, *Assiut University*, Assiut, Egypt.
- November 2004–November 2008 **Tutor–tenure-track**, *Assiut University*, Assiut, Egypt.

8 Scholarships, Honors, and Awards

- 2020 **Distinguished Reviewer**, *Deanship of Research*, *KFUPM*.
- 2019–2020, 2018–2019, 2017–2018 **Distinguish Performance (A+)**, *Faculty Affairs Committee*, *KFUPM*.
- 2017 **Outstanding Reviewer for Journal of Computational and Applied Mathematics**.
Best Paper Award in Natural Sciences, *Assiut University*.
- 2016 **AY2016-2017 Fulbright Egyptian Visiting Scholar Award (9 Months Grant)**.
- 2015 **TWAS-USM Postdoctoral Fellowship (Preliminary Acceptance)**.
- 2012 **Honorable mention for Bernard Neumann Prize**, awarded for the best student talk at the Annual Meeting of the Australian Mathematical Society (*AustMS*), see [The Bernhard Neumann Prize website](#).

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- 2009 **Monash Graduate Scholarship (MGS)**, *Monash University*, Australia.
Monash International Postgraduate Research Scholarship (MIPRS), *Monash University*, Australia.
School of Mathematical Sciences International Postgraduate Research Stipendiary Scholarship 2009, *Monash University*, Australia.
Faculty of Science Dean's International Postgraduate Research Scholarship, *Monash University*, Australia.
Graduate Assistantship, *Northern Illinois University*, USA.
- 2008 **Swinburne University Postgraduate Research Award (SUPRA)**, *Swinburne University of Technology*, Australia.
- 2004 **Assiut University Prize for Top Faculty Graduates**, *Assiut University*, Egypt.

9 Language Skills

Fluent in Arabic Language (mother tongue).
 Fluent in English Language.

- 2012 Passed the IELTS test held at Monash University with an overall band score 7.5.
 2009 Passed the TOEFL iBT test with Total Score 96.
 2006 Passed the English Language test in partial fulfillment of my M.Sc. degree held in the Faculty of Science at Assiut University with general grade "Excellent."

10 Analytical Writing, Verbal Reasoning, and Quantitative Reasoning Skills

- 2009 Passed the GRE test.

11 Computer Skills

Programming Languages & Software	FORTRAN, MATHEMATICA, MATLAB, Python, and GeoGebra.
Typesetting Systems	MS Word & \LaTeX .
Online Learning Management Systems	Blackboard 9.1, Moodle, Google Classroom, and Easyclass.
Online Grading Tools	Gradescope.
Frequently Used Applications	MathType, MS Office, Adobe Photoshop, Skype, MS Teams, Zoom, and Google Meet.

Operating Systems MS Windows.

12 Teaching Certification

26/10/2023– Teaching Permit from The Ministry of Higher Education, Malaysia.
21/08/2026

13 Teaching Experience

The following graduate and undergraduate level courses are/were taught with full responsibility including determining and grading assignments, quizzes, exams, holding office hours, and assigning course grades.

Graduate Courses

2020-2021 I. Lectures taught at KFUPM:

Academic Term	Course Code	Course Title	Number of Students	Students Evaluation (Out of 10)
202210	MATH513	Mathematical Methods for Engineers	24	9.48
202110	MATH582	Nonlinear Programming	6	9.82
202010	MATH513	Mathematical Methods for Engineers	21	9.05

2013-2017 II. Lectures taught at Assiut University:

- A Practical Guide to Scientific Computing Using MATLAB.
- MATLAB Software.

Undergraduate Courses

Aug. 2024 - I. Lectures taught at AU:

Dec. 2024

Academic Term	Course Code	Course Title	Number of Students	Midterm Students Evaluation (Out of 5)	Final Students Evaluation (Out of 5)
Aug. 2024	MTH121	Engineering Mathematics I			

Sept. 2023 - II. Lectures taught at XMUM:

Aug. 2024

Academic Term	Course Code	Course Title	Number of Students	Midterm Students Evaluation (Out of 5)	Final Students Evaluation (Out of 5)
Apr. 2024	BSC112	Engineering Mathematics I	13	4.14	3.76
Apr. 2024	BSC113	Engineering Mathematics II	27	4.49	4.44
Apr. 2024	BSC122	Calculus I B	13	4.72	4.44
Feb. 2024	G0123	Mathematical Graphics	59	-	4.64
Sept. 2023	BSC123	Calculus II	76	4.69	4.66
Sept. 2023	BSC124	Linear Algebra	69	4.71	4.79
Sept. 2023	COM 104	Engineering Maths (II)	13	4.91	4.81

2017-2022 III. Lectures taught at KFUPM:

Academic Term	Course Code	Course Title	Number of Students	Students Evaluation (Out of 10)
202210	MATH371	Introduction to Numerical Computing	21	9.56
202120	MATH202	Elements of Differential Equations	103	9.47
202110	MATH201	Calculus III	78	9.47
202020	MATH106	Applied Calculus	89	6.71
202010	MATH106	Applied Calculus	45	7.79
201920	MATH202	Elements of Differential Equations	82	9.38
201910	MATH472	Numerical Analysis II	7	9.84
201910	MATH102	Calculus II	38	9.49
201830	MATH101	Calculus I	66	9.34
201820	MATH371	Introduction to Numerical Computing	56	9.09
201810	MATH371	Introduction to Numerical Computing	55	9.43
201720	MATH101	Calculus I	55	9.02
201710	MATH101	Calculus I	58	8.81

2013-2017 IV. Lectures taught at Assiut University:

- Calculus.
- Introduction to Scientific Computing.
- Numerical Analysis.
- Operations Research: Modeling, Linear Programming, and Nonlinear Programming.

Specialized Short Courses

2019-2023 Specialized short courses taught at KFUPM:

Academic Term	Course Title	Number of Students	Students Evaluation (Out of 100)
202220	MATLAB	101	93.3
202210	MATLAB	69	87.1
202120	MATLAB	113	86.6
202110	MATLAB	121	87.9
202020	MATLAB	51	93.8
202010	MATLAB	50	92.6
201930	MATLAB	34	90.6
201920	MATLAB	64	96.2
201910	MATLAB	37	95.4

14 Tutoring Experience

The following undergraduate level courses were tutored with full responsibility including grading assignments and quizzes, and checking exam marks.

Undergraduate Courses

Tutorial classes taught at AU:

Aug. 2024 - [Engineering Mathematics I \(MTH121\)](#). [Engineering Mathematics III \(MTH221\)](#).
Dec. 2024

Tutorial classes taught at XMUM:

Apr. 2024 - [Calculus](#) [Engineering Mathematics I](#). [Engineering Mathematics II](#).
Aug. 2024
Sep. 2023 - [Linear Algebra](#). [Calculus](#).
Dec. 2023

The following undergraduate level courses were tutored with partial responsibility including grading assignments and quizzes, and checking exam marks.

Undergraduate Courses

2005-2013 Tutorial classes taught at Monash University and Assiut University:


[Algebra](#). [Advanced Engineering Mathematics](#). [Advanced Ordinary Differential Equations](#). [Analytical Geometry](#). [Calculus](#). [Differential Equations with Modeling](#).
[Fourier Series](#). [Introduction to Computational Mathematics](#). [Newtonian Mechanics](#).
[Numerical Analysis](#). [Ordinary Differential Equations](#). [Partial Differential Equations](#).
[Programming Languages \(FORTRAN, MATHEMATICA, MATLAB\)](#). [Scientific Computing](#). [Techniques for Modeling](#). [Vector Calculus](#).

15 Course Coordination Experience

I coordinated the following courses with full responsibility including course planning, course design and development, course delivery, selection of educational resources, assessment, students' learning

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outcomes, and course evaluation.

Graduate Courses

2020-2022 Graduate courses coordinated at KFUPM:

Academic Term	Course Code	Course Title	Number of Sections
202210	MATH513	Mathematical Methods for Engineers	1
202110	MATH582	Nonlinear Programming	1
202010	MATH513	Mathematical Methods for Engineers	1

2013-2017

- o A Practical Guide to Scientific Computing Using MATLAB, Assiut University.
- o MATLAB Software, Assiut University.

Undergraduate Courses

2023-2024 Undergraduate courses coordinated at XMUM:

Academic Term	Course Code	Course Title	Number of Sections
Apr. 2024	BSC112	Engineering Mathematics I	1
Apr. 2024	BSC113	Engineering Mathematics II	1
Apr. 2024	BSC122	Calculus I B	1
Sept. 2023	BSC123	Calculus II	1

2019-2020 Undergraduate courses coordinated at KFUPM:

Academic Term	Course Code	Course Title	Number of Sections
202020	MATH106	Applied Calculus	3
202010	MATH106	Applied Calculus	2
201910	MATH472	Numerical Analysis II	1
201820	MATH371	Introduction to Numerical Computing	4

2013-2017 Undergraduate courses coordinated at Assiut University:

- o Introduction to Scientific Computing.
- o Numerical Analysis.
- o Operations Research.

Specialized Short Courses

2019-2023 Specialized short courses coordinated at KFUPM:

Academic Term	Course Title	Number of Sections
202220	MATLAB	2
202210	MATLAB	1
202120	MATLAB	2
202110	MATLAB	2
202020	MATLAB	1
202010	MATLAB	1
201930	MATLAB	1
201920	MATLAB	1
201910	MATLAB	1

16 Course Development Experience

I developed the courses below.

- 2019-2023 MATLAB, Student Success Center, KFUPM. I taught this course in Terms 183, 191, 192, 193, 201, 202, 211 (twice), 212 (twice), 221, and 222 (twice).
- 2013-2017
- o A Practical Guide to Scientific Computing Using MATLAB, Assiut University.
 - o MATLAB Software, Assiut University.
 - o Introduction to Scientific Computing, Assiut University.
 - o Numerical Analysis, Assiut University.
 - o Operations Research, Assiut University.

17 Students Supervision

PhD Students

2020–Present **Hareth Mohamed**, *Sohag University*, Egypt.

Dissertation Title Direct Pseudospectral and Adaptive Spectral Element Methods for Solving Finite- and Infinite-Horizon Optimal Control Problems.

Status Ongoing.

Master Students

2016–2019 **Sayed Abd El Mohsen**, *Assiut University*, Egypt.

Dissertation Title Advances in the Numerical Solution of One-Dimensional Viscous Burgers' Equation Via Cole-Hopf Barycentric Gegenbauer Integral Pseudospectral Methods.

Status Completed.

2015–2019 **Hareth Mohamed**, *Sohag University*, Egypt.

Dissertation Title Pseudospectral Integration Methods and Adaptive Spectral Element Integration Methods for Solving Differential Equations of Lane-Emden and Singular Perturbation Types.

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Status Completed.

18 Undergraduate Students Advising

September 2023–Present **Chen Haorui**, *XMUM*, Malaysia.

He Xingyi, *XMUM*, Malaysia.

Lee Hao Tian, *XMUM*, Malaysia.

Liu Jinpeng, *XMUM*, Malaysia.

Lydia Yap Ern Whui, *XMUM*, Malaysia.

PANG XIN, *XMUM*, Malaysia.

Xie Changyun, *XMUM*, Malaysia.

Zhou Xuekangping, *XMUM*, Malaysia.

2021–December 2022 **Mohammed Hashim Barom**, *KFUPM*, KSA.

Abdualazez Ali Sharahy, *KFUPM*, KSA.

19 Final Year Projects Advising for Undergraduate Students

2024 **CHEN SIYUAN**, *XMUM*, Malaysia.

Project title: Curve Fitting by Means of Lagrange Interpolation: An Application in Mechanical Engineering

Kanobayita Uwera Venus, *XMUM*, Malaysia.

Project title: Derivation of Sugar Profile Contents in Rice During Storage Using Laplace Transformation

2014–2015 **Anod**, *Assiut University*, Egypt.

2013–2014 **Marwa**, *Assiut University*, Egypt.

20 Coop Students Advising

2022 **Emad Adel Aljafar**, *KFUPM*, KSA.

21 Industrial Training Examination for Undergraduate Students

2024 **Lin Jiaming**, *XMUM*, Malaysia.

Organization: Tianjiu Gongxiang Network Technology Group Co., LTD.

Tan Xiao Xian, *XMUM*, Malaysia.

Organization: SP Advisory Sdn Bhd.

Angeline Felicia Marie, *XMUM*, Malaysia.

Organization: Indonesian Embassy Kuala Lumpur .

Sylvano Laurentius Allen, *XMUM*, Malaysia.

Organization: Offspring Inc Sdn Bhd.

22 Research Projects and Grants

Internally-Funded Research Grants

2024–2026

Project Title “Optimal Periodic Fractional Control for Bioprocesses Used in Continuous Biological Water Treatment.”

Principle Investigator (PI) **Kareem T. Elgindy.**

Grant Number XMUMRF/2024-C13/IMAT/0030.

Status Ongoing.

2018–2019

Project Title “Spectral and Pseudospectral Methods for Solving Linear Partial Differential Equations in Complex Domains: High-Order Hybrid Integral Fourier Pseudospectral Collocation, Fourier-Continuation-Gram, and Fourier Extensions of Arbitrary Length Methods.”

PI **Kareem T. Elgindy.**

Consultant **John P. Boyd.**

Grant Number IN171046.

Status Completed.

Startup Research Grants

2017–2018

Project Title “High-Order Gegenbauer Integral Discontinuous Galerkin Methods: Advances in Computational Nonlinear PDE-Based Optimal Control Theory.”

PI **Kareem T. Elgindy.**

Consultant **Bülent Karasözen.**

Grant Number SR161013.

Status Completed.

23 ISI Journal Publications

Journal Publications Extracted from the M.Sc. Thesis

2008 [J1] **Kareem T. Elgindy** and Abdel-Rahman Hedar. A new robust line search technique based on Chebyshev polynomials. *Applied Mathematics and Computation*, Elsevier, 206(2), pp. 853–866. DOI: 10.1016/j.amc.2008.08.013. [An e-copy is available from this link.](#)

- 2009 [J2] **Kareem T. Elgindy**. Generation of higher order pseudospectral integration matrices. *Applied Mathematics and Computation*, Elsevier, 209(2), pp. 153–161. DOI: 10.1016/j.amc.2008.08.056. [An e-copy is available from this link.](#)

Journal Publications Extracted from the Ph.D. Thesis

- 2013 [J3] **Kareem T. Elgindy** and Kate A. Smith-Miles. Solving boundary value problems, integral, and integro-differential equations using Gegenbauer integration matrices. *Journal of Computational and Applied Mathematics*, Elsevier, 237(1), pp. 307–325. DOI: 10.1016/j.cam.2012.05.024. [An e-copy is available from this link.](#)
- [J4] **Kareem T. Elgindy** and Kate A. Smith-Miles. Optimal Gegenbauer quadrature over arbitrary integration nodes. *Journal of Computational and Applied Mathematics*, Elsevier, 242, pp. 82–106. DOI: 10.1016/j.cam.2012.10.020. [An e-copy is available from this link.](#)
- [J5] **Kareem T. Elgindy** and Kate A. Smith-Miles. Fast, accurate, and small-scale direct trajectory optimization using a Gegenbauer transcription method. *Journal of Computational and Applied Mathematics*, Elsevier, 251, pp. 93–116. DOI: 10.1016/j.cam.2013.03.032. [An e-copy is available from this link.](#)
- [J6] **Kareem T. Elgindy** and Kate A. Smith-Miles. On the optimization of Gegenbauer operational matrix of integration. *Advances in Computational Mathematics*, Springer US, 39, pp. 511–524. [An e-copy is available from this link.](#)

Journal Publications Extracted after Gaining the Ph.D.

- 2016 [J7] **Kareem T. Elgindy**. High-order numerical solution of second-order one-dimensional hyperbolic telegraph equation using a shifted Gegenbauer pseudospectral method. *Numerical Methods for Partial Differential Equations*, John Wiley & Sons, 32(1), pp. 307–349. DOI: 10.1002/num.21996. [An e-copy is available from this link.](#) [A preprint copy is also available from this link.](#)
- 2017 [J8] **Kareem T. Elgindy**. High-order, stable, and efficient pseudospectral method using barycentric Gegenbauer quadratures. *Applied Numerical Mathematics*, Elsevier, 113, pp. 1–25. DOI: 10.1016/j.apnum.2016.10.014. [An e-copy is available from this link.](#) [A preprint copy is also available from this link.](#)
- [J9] **Kareem T. Elgindy**. High-order adaptive Gegenbauer integral spectral element method for solving non-linear optimal control problems. *Optimization*, Taylor & Francis, 66(5), pp. 811–836. DOI: 10.1080/02331934.2017.1298597. [An e-copy is available from this link.](#) [A preprint copy is also available from this link.](#)
- 2018 [J10] **Kareem T. Elgindy**. Optimization via Chebyshev Polynomials. *Journal of Applied Mathematics and Computing*, Springer, 56(1–2), pp. 317–349. DOI: 10.1007/s12190-016-1076-x. [An e-copy is available from this link.](#) [A preprint copy is also available from this link and this link.](#)

- [J11] **Kareem T. Elgindy**. Optimal control of a parabolic distributed parameter system using a fully exponentially convergent barycentric shifted Gegenbauer integral pseudospectral method. *Journal of Industrial and Management Optimization, American Institute of Mathematical Sciences (AIMS)*, 14(2), pp. 473–496. DOI: 10.3934/jimo.2017056. [An e-copy is available from this link.](#) [A preprint copy is also available from this link.](#)
- [J12] **Kareem T. Elgindy** and Hareth M. Refat. High-order shifted Gegenbauer integral pseudo-spectral method for solving differential equations of Lane-Emden type. *Applied Numerical Mathematics, Elsevier*, 128, pp. 98–124. DOI: 10.1016/j.apnum.2018.01.018. [An e-copy is available from this link.](#) [A preprint copy is also available from this link.](#)
- [J13] **Kareem T. Elgindy** and Sayed A. Dahy. High-order numerical solution of viscous Burgers' equation using a Cole-Hopf barycentric Gegenbauer integral pseudospectral method. *Mathematical Methods in the Applied Sciences, John Wiley & Sons*, 41(16), pp. 6226–6251. DOI: 10.1002/mma.5135. [An e-copy is available from this link.](#)
- 2019 [J14] **Kareem T. Elgindy** and Bülent Karasözen. High-order integral nodal discontinuous Gegenbauer-Galerkin method for solving viscous Burgers' equation. *International Journal of Computer Mathematics. Taylor & Francis*, 96(10), pp. 2039–2078. DOI: 10.1080/00207160.2018.1554860. [An e-copy is available from this link.](#)
- [J15] **Kareem T. Elgindy**. A high-order embedded domain method combining a Predictor–Corrector–Fourier–Continuation–Gram method with an integral Fourier pseudospectral collocation method for solving linear partial differential equations in complex domains. *Journal of Computational and Applied Mathematics, Elsevier*, 361, pp. 372–395. DOI: 10.1016/j.cam.2019.03.032. [An e-copy is available from this link.](#)
- 2020 [J16] **Kareem T. Elgindy** and Bülent Karasözen. Distributed optimal control of viscous Burgers' equation via a high-order, linearization, integral, nodal discontinuous Gegenbauer-Galerkin method. *Optimal Control, Applications and Methods, John Wiley & Sons*, 41(1), pp. 253–277. DOI: 10.1002/oca.2541. [An e-copy is available from this link.](#)
- [J17] **Kareem T. Elgindy** and Hareth M. Refat. High-order Gegenbauer integral spectral element method integrated with an adaptive Chebyshev optimization strategy for solving linear singularly perturbed differential equations. *Journal of Computational and Applied Mathematics, Elsevier*, 372, pp. 112722. DOI: 10.1016/j.cam.2020.112722. [An e-copy is available from this link.](#)
- 2022 [J18] Sayed A. Dahy and **Kareem T. Elgindy**. High-order numerical solution of viscous Burgers' equation using an extended Cole-Hopf barycentric Gegenbauer integral pseudospectral method. *International Journal of Computer Mathematics. Taylor & Francis*, 99(3), pp. 446–464. [An e-copy is available from this link.](#)

- 2023 [J19] **Kareem T. Elgindy** and Hareth M. Refat. A direct integral pseudospectral method for solving a class of infinite-horizon optimal control problems using Gegenbauer polynomials and certain parametric maps. *AIMS Mathematics*, AIMS Press, 8(2), pp. 3561-3605. DOI: 10.3934/math.2023181. [An e-copy is available from this link.](#) [A preprint copy is also available from this link.](#)
- [J20] **Kareem T. Elgindy**. New optimal periodic control policy for the optimal periodic performance of a chemostat using a Fourier-Gegenbauer-based predictor-corrector method. *Journal of Process Control*, Elsevier, 127, pp. 102995. [An e-copy is available from this link.](#) [A preprint copy is also available from this link.](#)
- 2024 [J21] **Kareem T. Elgindy**. Fourier-Gegenbauer pseudospectral method for solving time-dependent one-dimensional fractional partial differential equations with variable coefficients and periodic solutions. *Mathematics and Computers in Simulation*, Elsevier, 218, pp. 544-555. [An e-copy is available from this link.](#) [A preprint copy is available from this link.](#)
- [J22] **Kareem T. Elgindy** and Hareth M. Refat. Direct integral pseudospectral and integral spectral methods for solving a class of infinite horizon optimal output feedback control problems using rational and exponential Gegenbauer polynomials. *Mathematics and Computers in Simulation*, Elsevier, 219, pp. 297-320. [An e-copy is available from this link.](#) [A preprint copy is available from this link.](#)
- [J23] **Kareem T. Elgindy**. Fourier-Gegenbauer pseudospectral method for solving periodic fractional optimal control problems. *Mathematics and Computers in Simulation*, Elsevier, 225, pp. 148-164. [An e-copy is available from this link.](#) [A preprint copy is available from this link.](#)
- [J24] **Kareem T. Elgindy**. Fourier-Gegenbauer pseudospectral method for solving periodic higher-order fractional optimal control problems. *International Journal of Computational Methods*, World Scientific Publishing, 21(07), pp. 2450015 (2024). [An e-copy is available from this link.](#) [A preprint copy is available from this link.](#)

24 Manuscripts Accepted for Publication in ISI Journals

- 2024 [J25] **Kareem T. Elgindy**. Optimal periodic control of unmanned aerial vehicles based on Fourier integral pseudospectral and edge-detection methods, *Unmanned Systems*, World Scientific Publishing. DOI: 10.1142/S230138502550075X. [An e-copy is available from this link.](#) [A preprint copy is available from this link.](#)
- [J26] **Kareem T. Elgindy**. Numerical solution of nonlinear periodic optimal control problems using a Fourier integral pseudospectral method, *Journal of Process Control*, Elsevier. Article reference: JJPC_JPROCONT-D-24-00296. [A preprint copy is available from this link.](#)

25 M.Sc. Degree Publications and Their Journals' JIF and Ranking

Journal #	Name of Journal	ISI* (Y/N)	JIF*	Quartile Ranking*
J1	Applied Mathematics and Computation	Y	0.961	Q2
J2	Applied Mathematics and Computation	Y	1.124	Q2

[*] as per year of publication.

26 Ph.D. Degree Publications and Their Journals' JIF and Ranking

Journal #	Name of Journal	ISI* (Y/N)	JIF*	Quartile Ranking*
J3	Journal of Computational and Applied Mathematics	Y	1.077	Q2
J4	Journal of Computational and Applied Mathematics	Y	1.077	Q2
J5	Journal of Computational and Applied Mathematics	Y	1.077	Q2
J6	Advances in Computational Mathematics	Y	1.562	Q1

[*] as per year of publication.

27 Postdoctoral Publications and Their Journals' JIF and Ranking

Journal #	Name of Journal	ISI* (Y/N)	JIF*	Quartile Ranking*
J7	Numerical Methods for Partial Differential Equations	Y	1.079	Q2
J8	Applied Numerical Mathematics	Y	1.263	Q2
J9	Optimization	Y	1.170	Q2
J10	Journal of Applied Mathematics and Computing	Y	—	Q1 (JCI QUARTILE)
J11	Journal of Industrial and Management Optimization	Y	1.025	Q3
J12	Applied Numerical Mathematics	Y	1.678	Q1
J13	Mathematical Methods in the Applied Sciences	Y	1.533	Q2
J14	International Journal of Computer Mathematics	Y	1.600	Q2
J15	Journal of Computational and Applied Mathematics	Y	2.037	Q1
J16	Optimal Control, Applications and Methods	Y	2.530	Q2
J17	Journal of Computational and Applied Mathematics	Y	2.621	Q1
J18	International Journal of Computer Mathematics	Y	1.8	Q2
J19	AIMS Mathematics	Y	1.8	Q1
J20	Journal of Process Control	Y	3.3	Q2
J21	Mathematics and Computers in Simulation	Y	4.4	Q1
J22	Mathematics and Computers in Simulation	Y	4.4	Q1
J23	Mathematics and Computers in Simulation	Y	4.4	Q1
J24	International Journal of Computational Methods	Y	1.4	Q2
J25	Unmanned Systems	Y	3	Q2
J26	Journal of Process Control	Y	3.3	Q2

[*] as per year of publication.

28 Published Thesis

- 2013 [T1] **Kareem T. Elgindy**. Gegenbauer Collocation Integration Methods: Advances in Computational Optimal Control Theory. Ph.D. thesis, Monash University, Australia–Melbourne. DOI: <https://doi.org/10.4225/03/58b63e343418e>. [An e-copy is available from this link.](#)

29 Published Abstracts in ISI Journals

- 2014 [A1] **Kareem T. Elgindy**. Gegenbauer Collocation Integration Methods: Advances in Computational Optimal Control Theory. Bulletin of the Australian Mathematical Society, Cambridge University Press, 89, pp. 168–170. [An e-copy is available from this link.](#)

30 Refereed Conference Publications

Refereed Conference Publications Extracted from the Ph.D. Thesis

- 2012 [C1] **Kareem T. Elgindy**, Kate A. Smith-Miles, and Boris Miller. Solving optimal control problems using a Gegenbauer transcription method. Proceedings of 2012 Australian Control Conference, AUCC 2012, IEEE & Engineers Australia (pp. 417–424). University of New South Wales, Sydney, Australia. [An e-copy is available from this link.](#)

31 Press and Media

- 5 July 2024 The research paper J23 was featured in XMUM Research and Innovation Related News Articles and Achievements; see this [link](#).
- 18 January 2024 The research papers J21 and J22 were featured in XMUM Research and Innovation Related News Articles and Achievements; see this [link](#) or this [link](#).
- 1 March 2013 An excellent recognition of my best student talk at AustMS annual meeting was featured in the Awards and Other Achievements Section of AustMS Gazette¹, Volume 40, Number 1, 2013; see this [link](#).

¹The Gazette of AustMS is a periodical publication for mathematicians and anyone interested in mathematics in Australia and the region. It is published five times a year by AustMS and offers a diverse range of content.

32 Citations

27 September
2024

Scopus

Documents 26 documents.
by author

Total 277 by 109 documents.
citations

h-index 10.

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17/24

Scopus 25648953500.

Author ID

Scopus <https://www.scopus.com/authid/detail.uri?authorId=25648953500>.
Author Link

Google Scholar

Total citations 354.

h-index 11.

i10-index 12.

Google scholar link <https://scholar.google.com/citations?user=9NAaLNMAAAAJ&hl=en>.

33 Web of Science

Web of Science
ResearcherID H-4137-2019.

Core Collection Metrics *H-Index: 9; Publications: 25; Sum of Times Cited: 246; Citing Articles: 100.*

34 ORCID iD

ORCID iD orcid.org/0000-0001-7369-4988.

35 arXiv Author ID

arXiv Author ID https://arxiv.org/a/elgindy_k_1.html.

36 Links to Social Media

ResearchGate <https://www.researchgate.net/profile/Kareem-Elgindy>.

37 Community Services

University Services

Sep. 2024-Present **Member of the Academic Reputation Task Force, AU.**

2020 **Member of the Ad-Hoc Committee to work out a proposal to infuse modeling, simulation, and computation into math courses, KFUPM.**

2018 **Member of the Evaluation Panel of the 9th Annual KFUPM Students Scientific Forum, KFUPM.**

Departmental Services

- Sep. 2024–Present **Chairman of the Student Discipline and Academic Integrity Committee**, *Department of Mathematics and Sciences, AU.*
- Member of the Scientific Research Committee**, *Department of Mathematics and Sciences, AU.*
- Member of the Timetable and Exam Committee**, *Department of Mathematics and Sciences, AU.*
- Coordinator of MTH121 (Engineering Mathematics I)**, *Department of Mathematics and Sciences, AU.*
- Apr. 2024–Aug. 2024 **Moderator and Vetter of SEM 102 (Quantitative Methods and Data Analysis I)**, *Mathematics Department, XMUM.*
- Mar. 2024 **Academic Appeals Committee Member**, *Mathematics Department, XMUM.*
- Sept. 2023–Jan. 2024 **Moderator and Vetter of MAT 102 (Calculus I)**, *Mathematics Department, XMUM.*
- 2022 **Member of MATH105 Coordination Committee**, *Mathematics Department, KFUPM.*
- Member of MATH371 Coordination Committee**, *Mathematics Department, KFUPM.*
- Member of MATH106 Coordination Committee**, *Mathematics Department, KFUPM.*
- Member of MS Optimization Program Road Map Committee**, *Mathematics Department, KFUPM.*
- Member of Faculty Promotion Committee**, *Mathematics Department, KFUPM.*
- Chair of Research Strategy Plan Development and Implementation Committee**, *Mathematics Department, KFUPM.*
- Member of Conference Application Evaluation Committee**, *Mathematics Department, KFUPM.*
- Member of Course Equivalency Committee**, *Mathematics Department, KFUPM.*
- Member of The Revision and Expansion Committee of New Courses**, *Mathematics Department, KFUPM.*
- Member of The Research and IRC Cooperation Committee**, *Mathematics Department, KFUPM.*
- 2021 **Member of MATH101 Committee for Online Homework**, *Mathematics Department, KFUPM.*

- Sept. 2020–Aug. 2021 **Member of the Recruitment Committee, Mathematics Department, KFUPM.**
- 2020 **Member of the Ad-Hoc Committee on Innovative Teaching Techniques, Mathematics Department, KFUPM.**
- Member of the Ad-Hoc Committee to thoroughly study all undergraduate and graduate courses, identify any potential overlap between similar courses within the department and other departments, and carry out a cross-listing of all courses that have an overlap of at least 70%, Mathematics Department, KFUPM.**
- Member of the Ad-Hoc Committee to formulate the required set of documents and processes to master a professional program for Computational Science and Engineering in the Mathematics Department, Mathematics Department, KFUPM.**
- 2019–Aug. 2021 **Chairman of the Textbook Committee, Mathematics Department, KFUPM.**
- 2018–December 2022 **Member of The Research Committee, Mathematics Department, KFUPM.**
- Member of the Academic Panel Interviews Committee, Mathematics Department, KFUPM.**
- 2018–2019 **Member of the Ad-Hoc Committee to respond to the recommendations of the National Commission for Academic Accreditation and Assessment (NCAAA), Mathematics Department, KFUPM.**
- Chairman of the Ad-Hoc Committee to find a new textbook for MATH371 course, Mathematics Department, KFUPM.**
- 2017–December 2022 **Member of the Exam Committee, Mathematics Department, KFUPM.**
- 2017–2018 **Member of The Technology Enhancement Committee, Mathematics Department, KFUPM.**

38 Professional Activities and Memberships

- February 2024–Present **Editor, International Journal of Mathematics and Mathematical Sciences, John Wiley & Sons, Inc., Current Impact Factor 1.**
Website: <https://onlinelibrary.wiley.com/journal/6396>
- October 2023–Present **Member of MyGRANTS For Researchers, The Ministry of Higher Education (MoHE), Malaysia.**
- 2012–2013 **Member of AustMS.**

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20/24

39 Seminars Organized

I organized the following seminars:

- 2018 [SO1] “**Adaptive Discontinuous Galerkin Method for Tsunami Modeling and Prediction on a Global Scale.**” (Invited Speaker: Professor Jan S. Hesthaven²), Department of Mathematics, College of Computing and Mathematics, KFUPM.
- [SO2] “**New Directions in Reduced Order Modeling.**” (Invited Speaker: Professor Jan S. Hesthaven), Department of Mathematics, College of Computing and Mathematics, KFUPM.

²Professor Jan S. Hesthaven is a Full Professor of Mathematics, Chair of Computational Mathematics and Simulation Science (MCSS), and the Dean of Basic Sciences at Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland.

40 Oral Conference Presentations

Oral Presentations Extracted from the Ph.D. Thesis

- 2012 [O1] “**A practical Gegenbauer collocation method for solving optimal control problems.**” AustMS 56th Annual Meeting. Mt Helen Campus, University of Ballarat, Ballarat, Australia. The conference was hosted by the School of Science, Information Technology and Engineering (SITE), University of Ballarat. [An e-copy of the presentation abstract is available from this link.](#)

Oral Presentations Extracted from the M.Sc. Thesis

- 2008 [O2] “**A new robust line search technique based on Chebyshev polynomials.**” The Second Conference for Young Scientists, Basic Science and Technology. Faculty of Science, Assiut University, Assiut, Egypt.

41 Poster Conference Presentations

Poster Presentations Extracted from the Ph.D. Thesis

- 2012 [P1] “**Solving optimal control problems using a Gegenbauer transcription method.**” Proceedings of 2012 Australian Control Conference, AUCC 2012. Scientia Centre, John Niland Scientia Building (G19), Kensington Campus, UNSW, Sydney, Australia. The conference is sponsored by Engineers Australia, IEEE Control Systems Society, NICTA, UNSW, and University of Technology Sydney.

42 Conferences Attended

- 2006 **The International Conference on Mathematical analysis and Its Applications (ICMAA06).** Assiut University, Assiut, Egypt. The conference was sponsored by the International Mathematical Union (IMU), ICTP, the Egyptian Mathematical Society, and Assiut University.

43 Webinars

Attendee

- 15 October 2024 [Wb1] **“AI-Powered Learning: The Future of Personalized Education with Pearson,”** Online Webinar presented by Dr. Christopher Hess, Director of Product Management at Pearson, and organized by Pearson Higher Education MEA. Dr. Christopher Hess explained the potential of the AI Study tool, how it supports the learning journey, and how it can be leveraged in the teaching practices; see <https://middleeast.pearson.com/events/ai-study-tool-webinar-oct.html>.

Chairman

- 2020 [Wb2] **“The Instructor Resources and Interactive Platforms of Sapling Learning for Calculus and Statistics Courses,”** Online Webinar presented by Macmillan International Higher Education and attended by a group of staff members of the Department of Mathematics, College of Computing and Mathematics, KFUPM.

44 Presented Research Talks, Workshops, and Orientations

Invited Speaker

- 2023 [W1] **“Numerical Optimization of Bioprocesses,”** Research Talk, Mathematics Department, School of Mathematics and Physics, XMUM. [See this link.](#)
- 2019 [W2] **“Review of Postdoctoral Works,”** The Supreme Council of Universities, Egypt.
- 2018 [W3] **“Advanced Numerical Methods,”** Junior Faculty Workshop, Department of Mathematics, College of Computing and Mathematics, KFUPM.

45 Research Talks Attended

- 2023 **Mathematical Modeling and Simulation of Heat and Mass Transfer Due To Nanofluid Flow Over Open Surfaces and Inside Closed Geometries,** XMUM, Malaysia.

46 Workshops and Orientations Attended

- 2024 **Transforming Pedagogy: Harnessing AI for Personalized Learning (English),** AU, UAE.
Academic Advising Workshop, AU, UAE.
IT Orientation Session for New Faculty Members, AU, UAE.
RPC Briefing Session: Grant Opportunities, Application and Claims, XMUM, Malaysia.
Introduction to Invigilation Workflow, XMUM, Malaysia.
Guidance on Mark Entry, XMUM, Malaysia.
- 2023 **Outcome-Based Education (OBE) Training,** XMUM, Malaysia.
Teaching Briefing, XMUM, Malaysia.

- Induction Training**, XMUM, Malaysia.
- IT Moodle Training**, XMUM, Malaysia.
- IT Services & Classrooms Multimedia Briefing**, XMUM, Malaysia.
- 2021 **IRC for Membranes and Water Security**, KFUPM, KSA.
- IRC for Intelligent Secure Systems**, KFUPM, KSA.
- 2019 **New Textbooks Distribution Model and Ordering Process**, KFUPM, KSA.
- Joint Workshop with the Math Department at Imam Abdulrahman Bin Faisal University**, KFUPM, KSA.
- 2018 **Fractional Models in Science & Engineering (FMSE18): Theory and Computation**, KFUPM, KSA.
- 2017 **Role and Responsibilities; Good Teaching Practices; Blackboard 9.1 LMS: The Online System for Teaching & Learning at KFUPM; Academic Requirements**, KFUPM, KSA.
- 2016 **How to Compete for a Research Fund**, Assiut University, Egypt.
- How to Design the E-Course**, Assiut University, Egypt.
- E-Learning**, Assiut University, Egypt.
- 2015 **University Management**, Assiut University, Egypt.
- Design and Conduct Scientific Research**, Assiut University, Egypt.
- Use of Technology in Teaching**, Assiut University, Egypt.
- 2013 **Management of the Research Team**, Assiut University, Egypt.
- Strategic Planning**, Assiut University, Egypt.
- Organizing Conferences**, Assiut University, Egypt.
- Research Ethics**, Assiut University, Egypt.
- Examination Systems and Student Assessment**, Assiut University, Egypt.
- Time and Conference Management**, Assiut University, Egypt.
- 2012 **Early Career Workshop of AustMS**, Novotel Forest Resort, Creswick.
The workshop was sponsored by University of Ballarat, Australia; the AustMS; the Australian Mathematical Sciences Institute (AMSI).
- 2009 **Scientific Publications**, Assiut University, Egypt.
- 2008 **Communication Skills in the Various Types of Education**, Assiut University, Egypt.
- Effective Presentation**, Assiut University, Egypt.
- Credit System**, Assiut University, Egypt.
- Occupation Behaviors**, Assiut University, Egypt.
- Standards of Quality in the Teaching Process**, Assiut University, Egypt.

47 Reviewing

Mathematical Reviews/MathSciNet.

48 Refereeing

I provided peer-review for the following journals:

- [R1] Acta Astronautica.
- [R2] AIMS Mathematics.
- [R3] Ain Shams Engineering Journal (ASEJ).
- [R4] Applied Mathematics and Computation.
- [R5] Applied Mathematics E-Notes.
- [R6] Applied Numerical Mathematics.
- [R7] Automatica.
- [R8] Cogent Mathematics & Statistics.
- [R9] Computational Methods for Differential Equations.
- [R10] Computers and Mathematics with Applications.
- [R11] Engineering Science and Technology, an International Journal (JESTCH).
- [R12] International Journal of Modelling and Simulation.
- [R13] International Journal of Robust and Nonlinear Control.
- [R14] International Journal of Systems Science.
- [R15] Journal of Computational and Applied Mathematics (CAM).
- [R16] Journal of Industrial and Management Optimization (JIMO).
- [R17] Journal of Inequalities and Applications.
- [R18] Journal of Mathematical Analysis and Applications (JMAA).
- [R19] Journal of Optimization Theory and Applications (JOTA).
- [R20] Mathematical Methods in the Applied Sciences.
- [R21] Optimal Control, Applications and Methods.
- [R22] TWMS Journal of Applied and Engineering Mathematics (TWMS J. App. Eng. Math.).

49 Research Projects Evaluation Panels

- 01/12/2023– Universiti Taylor's external panel for Fundamental Research Grant Scheme (FRGS)
06/01/2024 2024-1 evaluation.
- 01/06/2020– KFUPM internal panel for Startup Research Grant evaluation.
30/06/2020