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CURRICULUM VITAE

Name: Tareq Mohammad Hamadneh

Work Place: *Al Zaytoonah University of Jordan, Amman,*
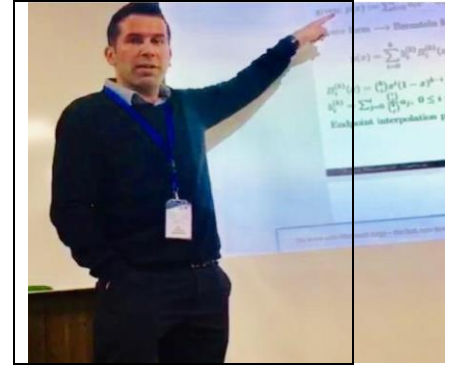
Jordan. Department of Mathematics

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h-index in Google Scholar: *6*
GoogleScholar:

https://scholar.google.com/citations?user=Mhcgds0AAAAJ&hl=en

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1. Personal Data
Place/Date of birth: *Saudi Arabia, July 27th, 1985*

Nationality: *Jordanian*

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2. EDUCATION
- 2013- Jan, 2018   **PhD** at the Department of Mathematics and Statistics, University of konstanz, **Germany.**
  Concentration: **Mathematical Optimization and Modeling.**
  Advisor: Prof Juergen Garloff.

- 2008- 2011   **M.Sc.** in Mathematics, Al al-Bayt University, **Jordan.**
  Concentration: Applied **Algebra**. Advisor: Prof Khaled Al-Sharo.

- 2003- 2007   **B.Sc.** in Mathematics, Al al-Bayt University, **Jordan**.

Ph.D. Dissertation
Bounding Polynomials and Rational Functions in the Tensorial and Simplicial Bernstein Forms.

M.Sc. Dissertaion
Weakly c-Normally Embedded Subgroups of Finite Groups

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3. Employment
- Sep 2018 - to date   **Assistant professor** at the Department of Mathematics, Al-Zaytoonah University of Jordan, Amman, Jordan.

- March 2019- to date   **Returning expert** at the German organization **GIZ**, funded by CIM.

- Feb 2017- Feb   **Post-Doc researcher** in Modeling and numerical optimization for

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2018	Control Theory, Section of Automation and Control, Aalborg University, **Denmark**. Supervisor: Rafael Wisniewski. CodeMe project.
• 2013-2017	**PhD candidate,** in modeling and global optimization methods at the Department of Mathematics and Statistics, University of Konstanz, Germany. Supervisor: Juergen Garloff.
• 2016	**Research assistant**, in Linear and quadratic Optimization, at the Department of Mathematics and Statistics, University of Konstanz, Germany. Supervisor: Juergen Garloff.
• 2015	Students and research assistant at the Department of Economics, University of Konstanz. Supervisor: Volker Hahn.
• 2007-2013	High school teacher of Mathematics, Jordan Ministry of Education, Al Mafraq City, Jordan.

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4. RESEARCH INTERESTS

- *Numerical Optimization*: Global and local optimization methods for random functions; tight enclosures for the range and graph of nonlinear functions; interpolation of interval valued data for algebraic and trigonometric polynomials, rational and splines. Solution of systems of linear equations with not sharply defined coefficients; solution of systems of algebraic equations.

- *Stability and Control Theory (Application)*: Lyapunov stability for linear and nonlinear control systems; Control Design; Stability of dynamic and hybrid systems. Expansion of polynomials and rational functions by *Bernstein expansion* and optimizing bounds for the range and graphs. Algorithms for controller and certificates of positivity.

- *Modeling*: Using of a new relaxation technique for multivariate polynomials and rational functions over different areas; minimization and positivity of nonlinear functions. Designing of new mathematical models for applications.

- *Differential Geometry:* Surfaces of finite types; faces of coordinate finite type; Laplace operator.

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5. HONORS AND AWARDS

- **2019**   **Best paper** award from the 2019 JEEIT conference to my joint paper, track mathematical modeling.

- **2016**   The International (one year) **Scholarship** for **PhD candidates,** University of Konstanz, Germany. This scholarship is offered every year to seven talent PhD students after writing a successful proposal

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and passing the interview.

- **2015**   **Research Assistant** (one semester) Fund from the Department of Economics at University of Konstanz, Germany.

6. TEACHING EXPERIENCE

- **Teaching** (since 2018)

  Mathematical modelling and optimization (1+2), Numerical analysis (1+2), Algebra (1), Linear Algebra (1+2), Ordinary Differential equations, Complex Analysis, Calculus at Al-Zaytoonah University of Jordan.

- **Teaching** (2008-2013)

  Mathematics high school teacher, Jordan Ministry of Education, Jordan. This was a long term experience of teaching and organizing various courses and school activities in Jordan.

ORGANIZATION

- **Organization**

  Working group in mathematical Optimization, Konstanz University of Applied Sciences (HTWG), Germany, for the SRP program, 2015. This group presented results from the SRP program to local seminars and master students in Konstanz.

- **Organization**

  Working group of bachelor students, Al al-Bayt University, Jordan, 2005-2007, collaboration between the welcome center and bachelor working group.

7. SCHOLARSHIPS AND RESEARCH PROJECTS

- **2019-2021**

  The research project fund by Al Zaytoonah University of Jordan about **Mathematical model** and control systems of Solar Energy, the grant number 2019-2018\585\G12.

- **2019-2022**

  The German organization: Deutsche Gesellschaft für Internationale Zusammenarbeit (**GIZ) fund for returning experts,** the project number 15.2011.3-003.30.

- **2017-2018**

  The Danish Council for Independent Research under the **grant** number DFF- 4005-00452 in the project **CodeMe,** Aalborg University, Denmark. I got this (Danish a ward) position after winning the competition and showing my worth theoretical results in Algebra for control.

- **2015**

  DAAD German Academic Exchange Service (Program: **DAAD stibet Doktoranden**), (one semester) research assistant funding, Germany.

- **2014**

  The **Grant** from University of Applied Sciences / HTWG Konstanz through the **SRP program**, Germany. This program was running for

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prof Juergen garloff and his team. I was involved in this project after achieving global results in extension the Bernstein basis to new classes of functions.

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8. NETWORK AND INTERNATIONAL ACTIVIVITIES

- **Al Zaytoonah University of Jordan (ZUJ):** I have been working with ZUJ as assistant professor in numerical optimization and modeling, since 2018-to date. Since I started this job, I published over eight papers in different areas of mathematics. I also **won a local grant** for supporting my research in mathematical model for stability of renewable energy systems, with Prof Amjed Zraiqat.

Figure 1. Barycentric coordinate subdivision steps of a triangle at edges and inner points.

- **Queen's University Belfast:** In the beginning of 2018, I have started the collaboration with Dr Nikolaos Athanasopoulos in order to convert pure control theory to numerical optimization and tools, for the proposed applications at QUB. We published two papers and submitted another one, together with formulating and announcing of our interested work by European fellowships.

- **Aalborg University:** In October, 2016, I got in touch with Prof Rafael Wisniewski in order to use the Bernstein optimization to develop the general theory for computing certificates of positivity for nonlinear control systems. I got a one year, 2017, **postdoc position** for the last year of the **CodeMe** project, **Synchronous** with the last stage of writing and reviewing my PhD thesis, supported by the Danish council for independent research. The life time of the CodeMe project was three years, 2014-2017, focusing on **optimization and stability of control systems, computations and modeling**. During this (last) year, the first submitted joint paper under certificates of positivity for rational functions provided algebraic identities certifying the positivity of a given rational function together with developing a subdivision strategy for triangles (simplex), Figure 1. The second one leaded to paper about optimization and stability of nonlinear systems by Lyapunov functions. This paper ensured asymptotic stability of the designed feedback system. The recent joint work also with Rafael Wisniewski resulted paper in **developing algorithms** and Synthesis of Linear Controllers. As consequence of this paper, the control synthesis problem is reduced to a finite number of evaluations of a polynomial, in one interval bound in the space of parameters, representing nonlinear controls and Lyapunov functions. In the recent paper with Athanasopoulos and Wisniewski, we used the Bernstein coefficients for finding control functions by solving a system of algebraic functions if the Lyapunov function is optimized.

- **University of Konstanz:** The research group (leaded by Prof Garloff) at University of Konstanz is a leading in numerical optimization and modeling. Juergen Garloff is an expert in Bernstein expansion and nonnegative matrices, http://www-home.fh-konstanz.de/~garloff/. I have started the collaboration with this group in 2013. The collaboration has resulted a **PhD** thesis includes three joint worth publications in constant bounding functions of high dimension nonlinear functions. Results **extended the Bernstein approach to the rational case** over boxes and simplices. The thesis has also developed optimization methods for fast computations of Bernstein control points that derive linear least squares functions for nonlinear functions.
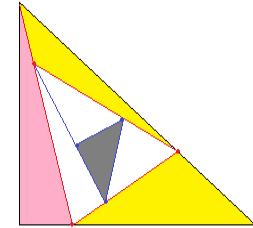
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- **Jordan Ministry of Education (JME):** As a **high school teacher**, I was working at JME for five years, 2008- 2013. Experience of teaching and dealing with school students in Jordan mad me pioneer in training and transferring skills of mathematics, computer science, sport and social relationships to many various audiences. Many activities and local projects have been organized and developed with my team at three different schools in Al Mafraq city, Jordan. Finally, a project for supporting and developing secondary schools at AL Mafraq city is on the plan as collaboration between JME and Europe.

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9. LIST OF PUBLICATIONS

Journal Papers

1- ISI	Bivariate Generalized Shifted Gegenbauer Orthogonal System. *Journal of Mathematics,* Volume 2021 (M. A. Alqudah and M. N. Almheidat and **T. Hamadneh**)
2- Scopus	Tubular surfaces of finite type Gauss map. *Journal of Geometry and Graphics*, Volume 25 (2021), No. 1, 45–52. (H. Al-Zoubi **, T. Hamadneh**, M. Abu Hammad and M. Al-Sabbagh)
3- ISI	Linear Optimization of Polynomial Rational Functions: Applications for Positivity Analysis. In *Mathematics- Journal*, 2020 (**T. Hamadneh**, M Ali and H. AL-Zoubi)
4- Scopus	Fast Computation of Polynomial Data Points over Simplicial Face Values. In the Journal of *Information and Knowledge Management, 2020 (***T. Hamadneh,** H. AL-Zloubi and S. Al Omari*)*.
5- Scopus	Tubes of coordinate finite type Gauss map in the Euclidean 3-space. *In the Indian Journal of Mathematics (IJM)*, May 2020. (H. Al-Zoubi, H. Al-Zaareer and **T. Hamadneh**).
6- Scopus	Control and Lyapunov Polynomials Using the Tensorial Bernstein Approximation; exact results. *The 21st IFAC World Congress*, July, 2020. (**T. Hamadneh,** N. Athanasopoulos and R. Wisniewski).
7- Scopus	Sufficient Conditions and Bounding Properties Using Linear Bernstein Basis for Control Functions. In the journal of *Applied Mathematics and Information Sciences*. (**T. Hamadneh**, A. Zraiqat, H AlZoubi and M. Elbes).
8- ISI	On the Affine Optimization Bound for Positivity Certificates of Rational Control Functions. 2021 (**T. Hamadneh**, R. Wisniewiski and A. Zraiqat). Under review

Scopus Articles

1- IEEE	Remotely Controlled Smart Home System using GSM and IOT, . In The 10th International **Conference** on Information Technology (ICIT 2021), July 2021. Accepted
2- IEEE	Minimization and Positivity of the Tensorial Rational Bernstein Form. In the 2019 IEEE Jordan International Joint Conference on Electrical Engineering and Information Technology (JEEIT), pp. 474-479, IEEE, 2019 (**T. Hamadneh,** N. Athanasopoulos and M. ALi), **Best paper award.**
3- IEEE	Conformable Fractional Bernoulli Differential Equation with applications. In the 2019 IEEE Jordan International Joint Conference on Electrical Engineering and Information Technology (JEEIT), pp. 421-424, IEEE, 2019 (**T. Hamadneh** with A. Dababneh et.).
4- IEEE	The Barycentric Bernstein Form for Control Design. In *2018 IEEE American Control Conference (ACC)*, USA. 2018, pp. 3738–3743 (*T. Hamadneh and R.*

	Wisniewiski).
5- IFAC	*Algorithm for Bernstein polynomial Control Design. 6th IFAC Conference on Analysis and Design of Hybrid Systems ADHS 2018,* Oxford. *pp. 283-189* (**T. Hamadneh** and R. Wisniewiski*).*
6- Springer	Convergence of the Simplicial Rational Bernstein Form**,** in Modelling, *Computation and Optimization in Information Systems and Management Sciences*, Le Thi Hoai An, Pham Dinh Tao, and Nguyen Ngoc Thanh, Eds., Series *Advances in Intelligent Systems and Computing*, Springer, 2015 (**T. Hamadneh** with J. Titi and J. Garloff).
7- Springer	Convergence and Inclusion Isotonicity of the Tensorial Rational Bernstein Form, proceeding of the 16th GAMM–IMACS International Symposium on Scientific Computing, Computer Arithmetic, (SCAN 2014), Warwick Tucker and Jürgen Wolff von Gudenberg, Eds., *Lecture Notes in Computer Sciences*, Springer, 2015 (J. Garloff and **T. Hamadneh**).

Preprints and Abstracts

1- Preprint	Linear Optimization of Polynomials and Rational Functions Over Boxes. arXiv preprint arXiv:1906.03472*, 2019. (**T. Hamadneh** H Al-Zoubi, M Al-Qudah, A Zraiqat)*
2- Preprint	Surfaces of revolution of finite III-type. arXiv preprint arXiv:1907.12390, 2019 *(H. Alzoubi and **T. Hamadneh*).*
3- Preprint	Optimization and Positivity Certificates of Rational Functions using Bernstein Form. arXiv preprint arXiv:1906.11037, 2019 (**T. Hamadneh,** H. Al-Zoubi, H. Alzaareer, R. Wisniewski).
4- Abstract	Global Optimization and Properties of Nonlinear Polynomial Functions Using Bernstein's Method. In the book of abstracts, *the International Conference Singular Problems, Blow-up, and Regimes with Peaking in Nonlinear PDEs. Moscow, November, 2019* (**T. Hamadneh** and A. Zraiqat).
5- Abstract	Convergence of the Rational Bernstein Form. In the book of abstracts, *16th GAMM-IMACS International Symposium on Scientific Computing, Computer Arithmetic and Validated Numerics,* SCAN 2014 (**T. Hamadneh** and J. Garloff).

In Preparation

1- Journal	Affine Bounding Models for Optimization and Reachability Analysis. *To Nonlinear Analysis Hybrid Systems journal, (2020) (with N. Athanasopoulos).*
2- Journal	Applications and Stability of Radical Control Functions in the Linear optimization Form. *To System and Control Letters journal.*

10. JOURNALS AND CONFERENCES PEER-REVIEWER

1- Automatica Journal

2- Nonlinear Analysis: Hybrid Systems (Journal)

3- International Journal of Advances in Soft Computing and Its Applications (IJASCA)

4- IEEE Transactions on Optimization, modeling and control

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11. TRAINING AND RESEARCH VISITS

Training (2019)	Dies ProGRANT **Proposal Writing for Research Grant**. Organized by University of Cologne and DAAD in Beirut, Lebanon, May and December.
Training (2019, 2020)	STEM **Early Career** Academics in Jordan Universities. Organized by the British Council, November, December, Jan.
Training (2019)	**Sustainable Development** through Effective Knowledge Sharing: Concepts, Methods and Processes. Organized by giz (German organization CIM), June 14-15.
Training (2019)	Applications in **Quality Management** Systems in ZUJ. Organized by the Jordanian Accreditation and Quality Assurance, June 24-26.
Research Visit (2018)	Queen's University Belfast, UK, August 13- 18.
Research Visit (2017)	University of **Rennes**, France, September 6- 9.
Training (2017)	**Marie Curie Talent Course for Proposal-Writing**, Aalborg University, Denmark, June 12- 13.

12. PROFESIONAL AND SCIENTIFIC TALKS

Talk and session chair (2021)	The 10th International **Conference** on Information Technology (ICIT 2021)
Talk (2020)	The IFAC World Congress 2020, Germany
Talk (2019)	The 2019 IEEE Jordan international joint conference on electrical engineering and information technology, Amman, Jordan.
Abstract (2018)	The 2018 American Control Conference, USA.
Abstract (2018)	IFAC Conference on Design of Hybrid Systems, ADHS, UK.
Talk (2018)	Department of Mathematics, Al-Zaytoonah University of Jordan.
Workshop (2017)	Community Based Care and Technology-supported Health, Aalborg University, May.
Talk (2017)	Department of Mathematics and Statistics, University of Konstanz, January.
Talk (2017)	Section of Automation and Control, Aalborg University**, May, 2017.**
Talk (2015)	The Conference of Modelling, computation and optimization in

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information system and management sciences (MCO 2015), Metz, France.

Talk (2016)	Department of Electrical and Computer Engineering, HTWG Konstanz, Germany, December.
Workshop (2016)	Surreal Numbers, Surreal Analysis, Hahn Fields and Derivations, University of Konstanz, December 18-23.
Workshop (2015)	O-Minimality and Applications, University of Konstanz, July 20-23.
Talk (2014)	The Conference, 16th GAMM-IMACS international sumposium on scientific computing, computer arithmetic, scan 2014, university of Wurzburg, Germany.
Workshop (2014)	Good Scientific Practice, University of Konstanz, June 26-27.

13. LANGUAGES AND SKILLS

- **Languages**   Native in Arabic
                    Fluent in English
                    Fluent in German

- **Computer**   Microsoft Office, Scientific Work Place, Latex.

- **Software**   Matlab.

REFERENCES

Rafael Wisniewski, Professor
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