

Mohammad-Sahadet Hossain, Ph.D.

CONTACT INFORMATION

Professor

Department of Mathematics and Physics,
North South University (NSU), Dhaka, Bangladesh



Former DEAN,
School of Engineering and Physical Sciences
North South University (NSU),
Dhaka, Bangladesh.

Former Chairman,
Department of Mathematics and Physics
North South University (NSU),
Dhaka, Bangladesh.

Former Additional Director,
Institutional Quality Assurance Cell
North South University (NSU),
Dhaka, Bangladesh.

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Block B, Bashundhara, Badda
Dhaka 1229
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CURRENT ACADEMIC APPOINTMENTS

- I am a Professor of Mathematics at the Department of Mathematics and Physics since April, 2022-till date.
- I was appointed as the **Dean** of the School of Engineering and Physical Sciences of North South University since March 2024-October 10,2024.
- I was appointed as the **Chairman** of the Department of Mathematics and Physics, North South University (Jan. 2020-March 2024).
- I was appointed as the **Additional Director** of the Institutional Quality Assurance Cell (IQAC) of NSU.
- I have been selected as the **Core Team Member** of the cell of Quality Assurance in Higher Education, UGC, Bangladesh.

RESEARCH
INTERESTS

My research interest includes, but not limited to, the following topics:

- System and control theory
- Model Reduction of periodic dynamical systems
- Iterative based solution of large sparse periodic matrix equation Development of
- Development of numerical algorithms for the reduced-order models

I have also research interest in

- Developing the frame of quality assurance in tertiary level education in Bangladesh and also in the developing counties, like Bangladesh.

PROFESSIONAL
DUTIES AND
RESPONSIBILITIES

- Currently working as the **Chairman** of the Department of Mathematics and Physics, North South University (January 2020-till date).
- Worked as **Coordinator (Professional Development)** of the **Institutional Quality Assurance Cell (IQAC)** at North South University (January 2019-Dec. 2019).
- Worked as an **additional Director** of the **Institutional Quality Assurance Cell (IQAC)** at North South University (January 2016-December 2018).
- Worked as a **coordinator of the biweekly colloquium** at the department.
- Acting as an **instructor for the undergraduate Mathematics Olympiad, NSU**.
- Supervising **undergraduate (UG) and Graduate (thesis/project)** students of ECE department.
- I am involved in the **Undergraduate Admission Test program** of North South University. My responsibilities include preparing questions for mathematics section of Undergraduate Admission Test. I have been taking this responsibility since Fall 2013 semester.
- I have been working as the **course coordinator** of the MAT 350 (Engineering Mathematics) course since Spring 2016. Before that I worked as a course coordinator of MAT-130 (Calculus-II), MAT-240 (Calculus-II) courses from Fall 2014 to Fall 2015. semester.
- Acting as a **member of the departmental faculty search committee** of my present department.
- I am a member of Bangladesh Mathematical Society (Life-Time Member).

TEACHING
EXPERIENCE

North South University, Dhaka.

- Pre-Calculus (MAT 116), Differential Calculus (MAT 120), Introduction to Linear Algebra (MAT 125), Integral Calculus (MAT 130), Series and Vector Calculus (MAT 240), Multivariate Calculus (MAT 250), Differential Equations and Orthogonal Functions (MAT 260), Differential Equations (MAT 480).
- Engineering mathematics(MAT 350), Advance Engineering mathematics(MAT 490)
- Control Engineering (EEE 342)

Otto-von-Guericke University Magdeburg, Magdeburg, Germany (Course proposal accepted).

- A collaboration program of the **International Max Planck Research School, Magdeburg** and the **Institute for Automation Engineering (Systems Theory and Automatic Control)**, **Otto-von-Guericke University Magdeburg**.
 - Course Name: Periodic Control Systems
 - Course Start: SS-2012

ACADEMIC
EDUCATION AND
RESEARCH

PostDoc, Sept. 2011 to Aug. 2012;
Computational Methods in Systems and Control Theory,
Max-Planck Institute for Dynamics of Complex Technical Systems, Magdeburg,

Germany.

Ph.D. in 2011;

Department of Mathematics, **Chemnitz University of Technology**, Germany, September, 2011.

- Area of Study: Control Theory and Model Reduction.
- Ph.D Thesis Title: "Numerical Methods for Model Reduction of Time-Varying Descriptor Systems".
- Grade: "**cum laude**" (80%-90% marks)

Integrated Master (course work) in 2006;

(Taken courses of Master (M.S) level and presented a number of seminar talks to enroll into the Ph.D. program) Department of Mathematics, **Chemnitz University of Technology**, Germany, April 2005- June 2006.

M.S. in 2005;

Department of Mathematics, University of Dhaka,

- Area of Study: Applied Mathematics.
- Examination year 2001. Exam held in 2004-2005. Year of passing 2005.
- Result: **First class, 3rd merit position.**

B.Sc. in 2003;

Department of Mathematics, University of Dhaka,

- Area of Study: Mathematics.
- Examination year 2000. Exam held in 2003. Year of passing 2003.
- Result: **First class, 4th merit position.**

HSC in 1995;

Notre Dame College, Dhaka,

- Result: **First division, 82.6% average.**

SSC in 1993;

Abdullapur M/L High School, Tongibari, Munshigonj, Dhaka,

- Result: **First division, 82.6% average.**

APPOINTMENTS
AND
PROFESSIONAL
EXPERIENCE

Professor

Department of Mathematics and Physics.
North South University, Dhaka.

April 2022 to Present Date

Dean

School of Engineering and Physical Sciences, NSU

March 2024 to October 2024

Chairman

Department of Mathematics and Physics, NSU

January 20, 2020 to March 2024

Associate Professor

Department of Mathematics and Physics.
North South University, Dhaka.

March 2017 to January 19, 2020

Coordinator (Professional Development)

IQAC, North South University, Dhaka.
(an additional administrative position)

Jan. 2019 to Dec. 2019

- Director(additional)** Jan. 2016 to Dec. 2018
 IQAC (World Bank (UGC) Funded Sub-Project)
 North South University, Dhaka.
 (an additional administrative position)
- Assistant Professor** Sept. 2014 to Feb. 2017
 Department of Mathematics and Physics.
 North South University, Dhaka.
- Assistant Professor** August 2012 to August 2014
 Department of Electrical and Computer Engineering (ECE).
 North South University, Dhaka.
- Research Scientist** Sept. 2011 to Aug. 2012
 Research Group: Computational Methods in Systems and Control Theory
 Max-Planck Institute for Dynamics of Complex Technical Systems, Magdeburg,
 Germany.
- Research Associate** Dec. 2008 - July 2009
 Research Group: Mathematics in Industry and Technology
 Chemnitz University of Technology, Germany.
- Scientific Assistant** July 2008 - Nov. 2008
 Department of Mathematics; Research Group: Numerical Analysis,
 with Prof. Dr. Tatjana Stykel.
 TU-Berlin, Germany.
- Research Associate** Oct. 2006 - June 2008
 Research Group: Mathematics in Industry and Technology
 Chemnitz University of Technology, Germany.

PUBLISHED BOOK AND BOOK CHAPTERS Mohammad Sahadet Hossain; Model Reduction of Time-Varying Descriptor Systems: Numerical Methods, Algorithms, and Applications; **Scholars' Press, Germany**. ISBN: 978-3-659-84001-2

P. Benner, M. -S. Hossain and T. Stykel. Model Reduction of Periodic Descriptor Systems Using Balanced Truncation; **Book Chapter**, in Lecture Notes in Electrical Engineering; Vol. -74, pages- 193-206. **Publisher: Springer-Verlag**, Berlin/ Heidelberg (Book published in 2011). doi:10.1007/978-94-007-0089-5_11

JOURNAL AND CONFERENCE PUBLICATIONS

1. Mohammad-Sahadet Hossain, E.H.Khan, M. Uddin, S.G. Omar, Structure-preserving model reduction approach for structured index-2 descriptor-systems, Numerical Linear Algebra with Applications, 2024, (Publisher: Elsevier)
2. Md. Tanzim Hossain, Kife I. Bin Iqbal, Azizul Haque, M. Monir Uddin, Mohammad Sahadet Hossain, Efficient aerodynamic design using BzierGAN and model order reduction: A computational study, Results in Engineering, Volume 23, 2024 (Publisher: Elsevier)
3. Siddiqui, N., Nahar, N., Hossain, M. S., Tazmeen, A., and Ali, K. S. (2024). Context-specific adaptation of a student engagement measure: a case study of a private university in Bangladesh. Cogent Education, 11(1), <https://doi.org/10.1080/2331186X.2024.2380638>, 2024 (Publisher: Taylor & Francis)
4. Tahiya Tasneem Oishee, Atia Afroz, Mohammad-Sahadet Hossain, and Oshin Mumtaha, "Generalized Krylov Subspace Based Model Order Reduction of Periodic Systems", Accepted in the ICICT2024, London, UK, 2024. Will be published as a Book Series of Lecture Notes in Networks and Systems, Publisher-Springer Singapore, 2024

5. Oshin Mumtaha, Atia Afroz, Mohammad-Sahadet Hossain, and Tahiya Tasneem Oishee, "Matrix Computation Based on ADI Method for Solutions of Discrete Lyapunov Equations and Application", In Proceedings of 15th International Conference on Contemporary Computing (IC3- 2023) at Jaypee Institute of Information Technology (JIIT, Noida), August, 2023 . Appeared in IEEE Xplore. DOI: <https://doi.org/10.1145/3607947.3607956>
6. Mohammad Sahadet Hossain, Atia Afroz, Oshin Mumtaha and Musannan Hossain, "A Novel ADI Based Method for Model Reduction of Discrete-Time Index 2 Control Systems", **Book Chapter in Machine Intelligence and Emerging Technologies, Publisher: Springer Nature**, pages: 499-512, 2023.
7. Atia Afroz, Mohammad Sahadet Hossain, Musannan Hossain, Mashrur Wasek, *Iterative approach for reduction of index 2 periodic models using generalized inverse procedure*. In Proceedings of Seventh International Congress on Information and Communication Technology: ICICT 2022, London, UK. Appeared in **Lecture Notes in Networks and Systems- Springer Nature**. vol 447, Springer, Singapore. 2022
8. Nahar, Nazmun, Siddiqui, Nazlee, Hossain, Mohammad Sahadet, Tazmeen, Ahmed; Ali, Khawaja Sazzad, *Path to Outcome Based Higher Education: An Analysis of Influence of Socio-demographic Factors on Student Engagement*. In EDUCON2022 IEEE Global Engineering Education Conference, Tunisia. Appeared in **IEEE Xplore**, 2022.
9. Mohammad-Sahadet Hossain, Atia Afroz and Musannan Hossain, *Algorithms for model order reduction of structured periodic control system and simulations of results*, In Proceedings of International Conference on Innovations in Science, Engineering and Technology (ICISSET) 2022, Chittagong, Bangladesh. pp. 245-250, doi: 10.1109/ICISSET54810.2022.9775882. Published in IEEE Xplore.
10. Xin Du, Kife I. Bin Iqbal, M. Monir Uddin, A. Mostakim Fony, Md. Tanzim Hossain, Mian Ilyas Ahmad, and Mohammad Sahadet Hossain, *Computational Techniques for H2 Optimal Frequency-Limited Model Order Reduction of Large-Scale Sparse Linear Systems*, **Journal of Computational Science**, Vol. 55, 2021 **Elsevier Journal**.
11. Nazmun Nahar, Mohammad Sahadet, Tania Rahman, *The COVID-19 Crisis Adaptation in Higher Education Model for institutional resilience in higher education in Bangladesh*, in proceedings of STAR 2021 Global Conference, India, 2021.
12. Mohammad-Sahadet Hossain, Muhtasim Alam Chowdhury, Md. Samiur Rahman; *A dual reduction strategy for reduce-order modeling of periodic control system*, **Results in Control and Optimization**, Volume 4, 2021, 100034, <https://doi.org/10.1016/j.rico.2021.100034>. **Elsevier Journal**; 2021.
13. Mohammad-Sahadet Hossain, Muhtasim Alam Chowdhury, Md. Samiur Rahman, *Structured Krylov Subspace Approach for Model Reduction of Periodic Control System in Lifted Form*. in proceedings of 6th International Conference on Inventive Computation Technologies (ICICT), India. DOI: 10.1109/ICICT50816.2021.9358796, **IEEE Xplore** . February, 2021
14. Mohammad-Sahadet Hossain, Aniqah Tahsin, Sufi Galib Omar, Ekram Hossain Khan, *Comparative analysis of model reduction strategies for circuit based periodic control problems*, **Asian Journal of Control**, **Publisher- John Wiley and Sons**. 2020.
15. Mohammad-Sahadet Hossain, Ekram Hossain Khan, Sufi Galib Omar, *An efficient algorithm for reduce order modeling of discrete-time index-2 descriptor control systems*, in proceedings of 22nd International Conference on Computer and Information Technology (ICCIT 2019). December 18-20, 2019. DOI:10.1109/ICCIT48885.2019.9038479. Appeared in **IEEE Xplore**, 2020. Received BEST PAPER AWARD.
16. Mohammad-Sahadet Hossain, *Recursive Smith-type Iterative Algorithm to Solve a Class of Periodic Lyapunov Equations Arising in Periodic Model Reduction*, Accepted to appear in **Malaysian Journal of Mathematical Sciences**, 13(3): 447464 (2019) **Paper in press**. 2019.

17. Mohammad-Sahadet Hossain, Sufi Galib Omar, Ekram Hossain Khan, *A new projection free algorithm for model reduction of discrete-time index-2 descriptor control systems*, in the proceedings of 21st International Mathematics Conference, Dhaka University, 6-8 December, 2019.
18. Mohammad-Sahadet Hossain, Ekram Hossain Khan, Sufi Galib Omar, *An efficient model reduction strategy for discrete-time index-2 descriptor control systems*, in proceedings of METT VIII - 8th Workshop on Matrix Equations and Tensor Techniques, **Max Planck Institute Magdeburg, Germany**. Nov. 6-8, 2019.
19. Mohammad Sahadet Hossain, Nazmun Nahar and Ahmed Tazmeen, "Assessment of existing teaching evaluation process in a higher education institution of Bangladesh". In 1st CETL Conference on Higher Education, August 22 and 23, 2019, University of Liberal Arts Bangladesh. Available from: <https://easychair.org/>, 2019.
20. Sufi Galib Omar, Mohammad-Sahadet Hossain, Ekram Hossain Khan, Aniqah Tahsin, *An efficient model reduction strategy for discrete-time index-2 descriptor control systems*; in the proceedings of International Conference on Electrical, Computer and Communication Engineering (ECCE, 2019). Appeared in **IEEEExplore**. doi:10.1109/ECACE.2019.8679509, 2019.
21. Mohammad Sahadet Hossain and Mohammad Monir Uddin, *Numerical methods for model reduction of periodic dynamical systems: Review and applications*; EasyChair Preprint Series, 2018, Preprint no. 547, 4 pages, Available from: <https://easychair.org/>, 2018.
22. Ekram Hossain Khan, Mohammad-Sahadet Hossain, Sufi Galib Omar, Aniqah Tahsin, Mohammad Monir Uddin, *K-cyclic Smith iterative method for model reduction of index-2 periodic control systems*; in the proceedings of International Conference on Innovations in Science, Engineering and Technology 2018 (ICISSET 2018), IIUC, Chittagong. Appeared in **IEEEExplore**. doi:10.1109/ICISSET.2018.8745602, 2018.
23. Nahar, N., Hossain, Mohammad-Sahadet, and Tazmeen, A : *Establishment of an Effective Institutional Quality Assurance Cell in a Higher Education Institution of Bangladesh: Case Study North South University*; in the proceedings of First International Conference on Quality Assurance in Higher Education 2018 (ICQAHE 2018), Bangladesh; Paper id: HE-015, pages: 45-52. 2018.
24. Mohammad-Sahadet Hossain, *Recursive Iterative Solutions of Periodic Lyapunov Equations Arising in Periodic Control Systems*, in proceedings of 20-th International Mathematics Conference, Dhaka University, 8-10 December, 2017. Paper id-P109. Published in 2018. Available from <https://bdmathsociety.org/>. 2017.
25. Mohammad Sahadet Hossain, Sufi Galib Omar, Aniqah Tahsin, Ekram Hossain Khan: *Efficient Reduced Order Modeling of Periodic Control Systems with Application to Circuit Problems*, in 4th International Conference on Advances in Electrical Engineering (ICAEE 2017), IUB, Dhaka, Bangladesh. Publisher- **IEEE**, doi:doi:10.1109/ICAEE.2017.82552017.
26. M. S. Hossain, and Peter Benner, Structure preserving iterative methods for periodic projected Lyapunov equations and their application in model reduction of periodic descriptor systems; **Numerical Algorithms**, publisher- **Springer, New York**; pp:1-24, 2017, doi:10.1007/s11075-017-0288-y.
27. Mohammad-Sahadet Hossain and M. Monir Uddin, Efficient Techniques for Solving the Periodic Projected Lyapunov Equations and Model Reduction of Periodic Systems; **Mathematical Problems in Engineering**, publisher- **Hindwai**; 11 pages, 2017, doi:doi:10.1155/2017/4362641.
28. Mohammad-Sahadet Hossain; Projection-Based Model Reduction for Time-Varying Descriptor Systems: New results. **Numerical Algebra, Control and Optimization (NACO)**, publisher-**American Institute of Mathematical Sciences(AIMS)**; vol: 6, issue:1, pp:73-90, 2016. doi:doi:10.3934/naco.2016.6.73.

29. M. Jamsher Ali, M. Shahjalal and M. Sahadet Hossain ; Analysis of Numerical Methods for Differential-Algebraic Equations: The one Step Methods. **Intern. J. Fuzzy Mathematical Archive** , vol: 10, issue:1, pp:83-92, 2016.
30. Mamun Molla, Zahangir Hossain, Mohammad-Sahadet Hossain; Laminar-to-transitional flow and Heat Transfer through Nano-fluid in a Square Cavity with Localized Heating from Below. In proceeding of the 11th International Conference on Mechanical Engineering (ICME2015), BUET, Dhaka.
31. M. S. Hossain, and Peter Benner, "On model reduction of periodic descriptor systems exploiting the generalized inverses of periodic matrix pairs". Preprints of the Max-Planck Institute for Dynamics of Complex Technical Systems, Magdeburg, Germany; July, 2015. ISBN/ISSN: MPIMD/15-08.
Available from <http://www.mpi-magdeburg.mpg.de/preprints/>
32. Mehrab Hossain Likhon, Mohammad Sahadet Hossain, and Shamsil Arifeen; Model Order Reduction of Continuous LTI Large Descriptor System Using LRFCF-ADI and Square Root Balanced Truncation; In proceeding of **The World Congress on Engineering 2015, Vol-I, London, U.K.**, 1-3 July, 2015.
33. M. S. Hossain, and M. M. Uddin . Reduce Order Modelling of Power System Models Using Interpolatory Projections Technique. **International Journal of Modeling and Optimization**, 5(3):228-233,2015.
34. Ashfiqur Rahman, and M. S. Hossain. SVD-Krylov Based Model Reduction for Time-Varying Periodic Descriptor Systems. In proceeding of the 2nd International Conference on Electrical Engineering and Information Technology (ICEEICT 2015), Dhaka, Bangladesh. Appeared in **IEEE Xplore**. doi:10.1109/ICEEICT.2015.7307363
35. M.-S. Hossain, P. Benner. Generalized Inverses of Periodic Matrix Pairs and Model Reduction for Periodic Control Systems; In proceeding of the 1st International Conference on Electrical Engineering and Information Communication Technology (ICEEICT 2014), MIST, Dhaka, Bangladesh, April 10-12, 2014. Appeared in **IEEE Xplore**. doi:10.1109/ICEEICT.2014.691
36. P. Benner, M. -S. Hossain and T. Stykel. Low-rank iterative methods for periodic projected Lyapunov equations and their application in model reduction of periodic descriptor systems; **Numerical Algorithms**, publisher- **Springer**; vol: 67, num:3, pp:669-690, 2014.
37. M.-S. Hossain, P. Benner. Generalized Inverses of Periodic Matrix Pairs and their Application to Model Reduction of Periodic Systems; In proceedings of the 18th International Mathematics Conference 2013, pages 162-163, Independent University Bangladesh, March 20-22, 2014.
38. Ashfiqur Rahman, Mohammad Sahadet Hossain. Model reduction of discrete-time systems using SVD-Krylov based iterative method; In proceedings of the 18th International Mathematics Conference 2013, pages 196-197, Independent University Bangladesh, March 20-22, 2014.
39. M. Jamsher Ali, M. Shahjalal and M. Sahadet Hossain. Analysis of Numerical Methods for Differential-Algebraic Equations: The One Step Methods. In proceedings of the 18th International Mathematics Conference 2013, page-158, Independent University Bangladesh, March 20-22, 2014.
40. M.-S. Hossain, P. Benner. Structure Preserving Iterative Solutions of Periodic Projected Lyapunov Equations, In proceedings of the International Conference on Mathematical Modelling (MATHMOD) February 14 - 17, 2012 at Vienna University of Technology, Austria. Appeared in **IFAC-PapersOnLine**, Vol.-7, part-1, pages-276-281; 2012. doi:10.3182/20120215-3-AT-3016.00048.
41. M.-S. Hossain, P. Benner. Iterative Solvers for Periodic Matrix Equations and Model Reduction for Periodic Control Systems; In proceedings of the 7th International Conference

- on Electrical and Computer Engineering (ICECE 2012), December 20 - 22, 2012, Dhaka, Bangladesh. Appeared at **IEEE Xplore**, 2012.
doi:10.1109/ICECE.2012.6471669.
42. Mohammad-Sahadet Hossain, Peter Benner; Projection-Based Model Reduction for Time-Varying Descriptor Systems: New results. Preprints of Max Planck Institute, Magdeburg; 2012. ISBN/ISSN: MPIMD/12-04.
Available from <http://www.mpi-magdeburg.mpg.de/preprints/>
 43. Mohammad Sahadet Hossain. Numerical Methods for Model Reduction of Time-Varying Descriptor Systems; PhD Thesis; Sept. 2011. Published through Qucosa (Quality content of Saxony, Germany), 229 pages.
Available at: <http://nbn-resolving.de/urn:nbn:de:bsz:ch1-qucosa-74776>.
 44. P. Benner, M. -S. Hossain and T. Stykel. Low-rank iterative solution of periodic projected Lyapunov equations and their application in model reduction of periodic descriptor systems. Chemnitz Scientific Computing; CSC/11-01; 2011. ISBN/ISSN: 1864-0087; Chemnitz University of Technology; Germany, 2010.
 45. M. -S. Hossain, M. M. Rahman. A Study of Linear Differential Algebraic Equations With Constant Coefficients; Journal of Science and Technology, Volume 4, Issue 2, July 2009, Daffodil international University, Bangladesh.
 46. M. -S. Hossain and P. Benner. Projection-Based Model Reduction for LTV Descriptor Systems Using Multipoint Krylov Subspace Projectors; **Applied Mathematics and Mechanics**; Vol. 8, No. 1, pages- 10081-10084, 2008.
doi:10.1002/pamm.200810081
 47. M. -S. Hossain, P. Benner. Model Reduction for Time-Varying Descriptor Systems Using Krylov-Subspaces Projection Techniques ; Preprint, Chemnitz University of Technology; Germany, 2007.

INTERNATIONAL
CONFERENCE AND
SEMINAR TALKS

- An efficient model reduction strategy for discrete-time index-2 descriptor control systems, In METT VIII - 8th Workshop on Matrix Equations and Tensor Techniques, Max Planck Institute Magdeburg, Germany. November 6-8, 2019.
- Assessment of existing teaching evaluation process in a higher education institution of Bangladesh. In 1st CETL Conference on Higher Education, August 22 and 23, 2019, University of Liberal Arts Bangladesh.
- Recursive Iterative Solutions of Periodic Lyapunov Equations Arising in Periodic Control Systems; in 20-th International Mathematics Conference, Dhaka University, 8-10 December, 2017
- Numerical methods for model reduction of periodic dynamical systems: Review and Applications. Extended Abstract in proceeding of the 9th International Mathematics Conference, Dec 18-20, 2015, BRAC University, Dhaka.
- Reduce Order Modelling of Power System Models Using Interpolatory Projections Technique. The 4th International Conference on Engineering Mathematics and Physics, June 11-12, 2015 at Kuala Lumpur, Malaysia.
- Model Reduction of periodic descriptor systems exploiting the generalized inverses of periodic matrix pairs; Research Seminar, Max Planck Institute for Dynamics of Complex Technical Systems, Magdeburg, Germany. May 20, 2014.

Generalized Inverses of Periodic Matrix Pairs and Model Reduction for Periodic Control Systems; 1st International Conference on Electrical Engineering and Information Communication Technology (ICEEICT 2014), MIST, Dhaka, Bangladesh, April 10-12, 2014.

Iterative Solvers for Periodic Matrix Equations and Model Reduction for Periodic Control Systems, 7th International Conference on Electrical and Computer Engineering (ICECE 2012), December 20 - 22, 2012, Dhaka, Bangladesh.

Solving large scale projected periodic Lyapunov equations using structure- exploiting methods, SIAM Conference on Applied Linear Algebra, June 18-22, 2012, Valencia, Spain.

Structure Preserving Iterative Solution of Periodic Projected Lyapunov Equations; 7th Vienna International Conference on Mathematical Modelling, February 14-17, 2012, Vienna University of Technology, Austria.

Low-rank iterative solution of periodic projected Lyapunov equations; International Conference on Model Reduction for Complex Dynamical Systems 2010, TU Berlin, December 2-4, 2010, Germany.

On Model Reduction for Periodic Descriptor Systems Using Balanced Truncation; Workshop On Model Reduction for Circuit Simulation, 30. and 31. October 2008 in Hamburg, Germany.

Projection-Based Model Reduction for LTV Descriptor Systems Using Multipoint Krylov Subspace Projectors; GAMM Annual Meeting 2008, Bremen, Germany.

Model Reduction of Linear Time-Varying Systems Using Multipoint Krylov-Subspace Projections; Berlin-Braunschweig-Chemnitz Workshop On Recent Advance in Model Reduction, November 27, 2006; Chemnitz, Germany.

RESEARCH PROJECT Department of Mathematics and Physics
UNDERTAKEN North South University (NSU), Dhaka, Bagladesh

NSU Funded Project

May 2019 to December 2019

- *Numerical Methods for Model Reduction of Index-2 Periodic Descriptor Systems with Application to Circuit Simulation.*
 - Find a suitable model order reduction (MOR) strategy which preserves the structure of the original model and computes a reduced-order model of periodic circuit models
 - Develop and analyze efficient algorithms (using MATLAB software) for the proposed MOR methods
 - Simulate the developed algorithms using real-life data and illustrate the results and validate the results with comparisons to other existing reduction methods

Department of Mathematics and Physics
North South University (NSU), Dhaka, Bagladesh

NSU Funded Project

March 2017 to October 2017

- *Reduced order modeling of periodic control systems with application to circuit problems.*
 - Work load includes analyzing and applying different model reduction schemes for periodic continuous-time descriptor systems originated from electrical circuit problems
 - Develop efficient numerical algorithms (MATLAB codes) for the model reduction process for circuit problems having periodic responses.

Department of Electrical Engineering and Computer Science (EECS)
North South University (NSU), Dhaka, Bagladesh

NSU Funded Project

October 2013 to March 2014

- *Efficient model reduction of electrical networks of large integrated circuits (ICs) affected by parasitic couplings.*
 - Work load includes SVD-Krylov based iterative solutions of matrix equations and apply them for further model reduction procedure of electrical circuit problems.

- Develop efficient numerical algorithms (MATLAB codes) for the above research activities.

Max-Planck Institute for Dynamics of Complex Technical Systems, Magdeburg, Germany

Research Group Funded Project

September 2011 to July 2012

- *Periodic Control Systems: Efficient Model Reduction and Development of Numerical Algorithms.*
 - Periodic Control Theory and Application
 - Iterative Solution of Periodic Matrix Equation
 - Model Reduction of Time-Varying Descriptor Systems
 - Development of Efficient Algorithms

Chemnitz University of Technology, Chemnitz, Germany

Research Group Funded Project

August 2009 to July 2011

- *Development and Implementation of Numerical Algorithms for Model Reduction of Periodic Descriptor Systems.*
 - Model reduction of Linear Time-Varying Descriptor Systems
 - Control Theory and Applications

TU-Berlin, Germany.

BMBF (Federal Ministry of Education and Research, Germany) Funded Project

July 2008 to Nov. 2011

- *System Reduction for Nanoscale IC Design (SyreNe)*
 - Model Reduction of Coupled Systems
 - Solution Techniques of Projected Periodic Lyapunov Equations
 - Reduced-Order Modeling of Periodic Systems

Chemnitz University of Technology, Chemnitz, Germany

DFG (German Research Foundation) Funded Project

Oct. 2006 to July. 2008

- *Automatic, Parameter-Preserving Model Reduction for Applications in Microsystems Technology.*
 - Model Reduction of Parametric Systems
 - Reduced-Order Modeling of Periodic Descriptor Systems Using Krylov Projections.

SOFTWARE SKILLS

Computer Programming:

- C, FORTRAN, MATLAB, Maple, Mathematica and others

MATLAB skill set:

- Linear algebra, Matrix computations, Numerical methods, Visualization.
- Toolboxes: Communications, Control system, Signal processing, System identification.

Productivity Applications:

- T_EX (L^AT_EX, B_IB_TE_X), HTML, MS-Office Products.

Operating Systems:

- Microsoft Windows (familiar), Linux.

PERSONAL INFORMATION

- Date of Birth: December 7, 1978
- Place of Birth: Munshigonj, Bangladesh
- Nationality : Bangladeshi
- Marital Status: Married (since March 2009)
- Children : I am gifted by a son and a daughter from my Almighty.
- Country Visited: Germany (for study and research, year 2005-2012), Italy, Switzerland, Netherlands, Czech Republic, France, India, Thailand, Malaysia.
- Personal Interest: Photography, Book Reading.

REFERENCES
AVAILABLE TO
CONTACT

Prof. Dr. Peter Benner

- Director, Max-Planck Institute for Dynamics of Complex Technical Systems,
 - Head of the Research Group- Computational Methods in Systems and Control Theory
 - D-39106 Magdeburg, Germany
 - E-mail: benner@mpi-magdeburg.mpg.de; phone: +49-391-6110-450
- ★ *Dr. Benner was my Ph.D. supervisor.*

and

Professor, Chemnitz University of Technology, Chemnitz, Germany

- Research group-Mathematics in Industry and Technology
- E-mail: benner@mathematik.tu-chemnitz.de; phone: +49-371-531-22540; (-22000 for secretary)
- D-09107 Chemnitz, Germany

Prof. Dr. Javed Bari

- Dean, School of Engineering and Physical Sciences (SEPS), North South University, Dhaka, Bangladesh
 - ◇ Plot-15, Block B, North South University , Bashundhara, Badda, Dhaka 1229, Bangladesh
 - E-mail: javed.bari@northsouth.edu
 - Phone: +88(02) 55668200 -ext 1500.