Curriculum Vitae

Dr. Sumit Nagpal
Assistant Professor
Department of Mathematics
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EDUCATION

- **Ph. D.** (Mathematics) (2014)
  Department of Mathematics, University of Delhi
  Supervisors: Prof. Ajay Kumar and Prof. V. Ravichandran
  Date of Registration: May 30, 2011
  Title of Thesis: Close-to-convex planar harmonic univalent mappings.
  Date of Submission: November 18, 2013
  Date of Viva-Voce: November 28, 2014

- **M. Phil.** (Mathematics) (2011)
  Department of Mathematics, University of Delhi
  Supervisor: Dr. V. Ravichandran
  Title of Dissertation: First and second order differential subordinations and radius problems for Caratheodary functions.
  Division: First, *Marks obtained:* 420/500, *Percentage:* 84%.

- **M. Sc.** (Mathematics) (2009)
  Hindu College, University of Delhi
  Division: First, *Marks obtained:* 1344/1600, *Percentage:* 84%.

- **B. Sc.** (Mathematics) (2007)
  Hindu College, University of Delhi
  Division: First, *Marks obtained:* 818/900, *Percentage:* 90.88%.

- **All India Senior School Certificate Examination (AISSCE)** (2004)
  The Adarsh School, Kirti Nagar, New Delhi
  Central Board of Secondary Education (CBSE)
  Division: First, *Marks obtained:* 472/500, *Percentage:* 94.4%.

- **All India Secondary School Examination (AISSE)** (2002)
  The Adarsh School, Kirti Nagar, New Delhi
  Central Board of Secondary Education (CBSE)
  Division: First, *Marks obtained:* 454/500, *Percentage:* 90.8%.

TEACHING AND RESEARCH EXPERIENCE

- Assistant Professor, Department of Mathematics, Faculty of Mathematical Sciences, University of Delhi, since October 4, 2022.
- Assistant Professor, Department of Mathematics, Ramanujan College, University of Delhi, March 7, 2014 – October 3, 2022.
- Assistant Professor (ad-hoc), Department of Mathematics, Faculty of Mathematical Sciences, University of Delhi, January 7, 2014 – March 6, 2014.
- Senior Research Fellow (CSIR) (January 2012 – December 2013)
  Junior Research Fellow (CSIR) (January 2010 – December 2011)
  Department of Mathematics, University of Delhi, Delhi, India.

ACADEMIC AWARDS

- Awarded a cash prize of Rs. 15,000/- and a memento by Internal Quality Assurance Cell (IQAC), Ramanujan College for publishing research article in Web of Science Journal in 2020.
- Awarded Ramanujan College Achievement Award 2019 and a prize of Rs. 50,000/- by Internal Quality Assurance Cell (IQAC), Ramanujan College for outstanding contribution to research and getting highest number of publications in reputed journals in the college.
- Secured 15th rank in Joint CSIR-UGC Test for JRF and NET held on 21-06-2009.
- Awarded certificate by Hindu College for standing first in the college in M. Sc (Final) Mathematics Examination held in April, 2009.
- Awarded certificate by Hindu College for standing first in the college in B. Sc (Hons) Mathematics 3rd year Examination held in April, 2007.
- Awarded certificate of merit by Central Board of Secondary Education (CBSE) for outstanding academic performance and for being among the top 0.1 percent of successful candidates in AISSCE 2004 in the subjects: Informatics Practices and Chemistry.

RESEARCH INTERESTS

Differential Subordinations: The differential subordination is the complex analogue of the differential inequality in the real line and differential superordination is its dual concept. We have developed the theory of differential subordination for functions with preassigned initial coefficient by making appropriate modifications and improvements to the existing Miller and Mocanu's subordination theory. This new theory has several interesting applications in univalent function theory.

Geometric Properties of functions defined by subordination: In 1992, Ma and Minda unified various subclasses of starlike functions in terms of subordination. Using this notion, we have introduced and defined various classes of starlike function which are associated with exponential function, right half of the shifted lemniscate of Bernoulli and cardioid. Various inclusion relations,coefficient bounds and radius problems are derived for these newly defined classes of univalent functions.

Harmonic Univalent Mappings: A planar harmonic univalent mapping is a com-plex valued function that does not take the same value twice and whose real and imaginary parts have continuous second partial derivatives satisfying the Laplace equation. The study of planar harmonic univalent mappings initiated by Clunie and Sheil-Small in

1984, is a fairly active area of research. We investigate the properties of various subclasses of harmonic univalent functions defined by natural geometric conditions such as the classes of starlike, convex and close-to-convex harmonic functions.

Academic Responsibilities

PHD SUPERVISION (COMPLETED)

- Ms. Prachi Gupta, Department of Mathematics, University of Delhi (July 2022) with the title of thesis "Radius Constants and Differential Subordination for Certain Subclasses of Analytic Functions."

PHD SUPERVISION (IN PROGRESS)

- Ms. Gurpreet Kaur, Mata Sundri College, University of Delhi
- Ms. Adiba Naz, Department of Mathematics, University of Delhi.
- Mr. Ankur Raj, Department of Mathematics, University of Delhi

M.PHIL. SUPERVISION (COMPLETED)

- Ms. Adiba Naz, Department of Mathematics, University of Delhi (August 2018) with the title of dissertation "Certain Special First and Second order Differential Subordinations."

Publications

2022

(1) Shweta Gandhi, Prachi Gupta, **Sumit Nagpal** and V. Ravichandran, Starlike functions associated with an Epicycloid, *Hacettepe Journal of Mathematics and Statistics*, Appeared online.

SCIE, Print ISSN : 2651-477X, Online ISSN : 2651-477X.

(2) Ankur Raj and **Sumit Nagpal**, Radius of Convexity for Analytic Part of Sense-Preserving Harmonic Mappings, *Bulletin of the Malaysian Mathematical Sciences Society* **45** (2022), no. 5, 2665–2679.

SCIE, Print ISSN : 0126-6705, Online ISSN : 2180-4206.

(3) Virendra Kumar, Sumit Nagpal and N. E. Cho, Coefficient functionals for non-Bazilevič functions, *Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matematicas. RACSAM* **116** (2022), no. 1, Paper No. 44, 14 pp.

SCIE, ISSN: 1578-7303.

2021

(4) Prachi Gupta, **Sumit Nagpal** and V. Ravichandran, Inclusion relations and radius problems for a subclass of starlike functions, *Journal of the Korean Mathematical Society* **58** (2021), no. 5, 1147–1180.

SCIE, Print ISSN: 0304-9914, Online ISSN: 2234-3008.

(5) Prachi Gupta, **Sumit Nagpal** and V. Ravichandran, Marx-Strohhäcker theorem for multivalent functions, *Afrika Matematika* **32** (2021), no. 7-8, 1421–1434.

SCOPUS/ ESCI, ISSN: 1012-9405.

(6) Ankur Raj, **Sumit Nagpal** and V. Ravichandran, On the product of planar harmonic mappings, *Computational Methods and Function Theory* **21** (2021), no. 3, 427–452.

SCIE, ISSN: 1617-9447.

2020

(7) Adiba Naz, **Sumit Nagpal** and V. Ravichandran, Exponential Starlikeness and Convexity of Confluent Hypergeometric, Lommel and Struve Functions, *Mediterranean Journal of Mathematics*, **17** (2020), no. 6, Paper No. 204, 22 pp.

SCIE, Print ISSN: 1660-5446, Online ISSN: 1660-5454.

2019

(8) Adiba Naz, **Sumit Nagpal** and V. Ravichandran, Star-likeness associated with the exponential function, *Turkish Journal of Mathematics*, **43** (2019), no. 3, 1353–1371.

SCIE, Print ISSN: 1300-0098, Online ISSN: 1303-6149.

2017

(9) O. P. Ahuja, **Sumit Nagpal** and V. Ravichandran, A technique of constructing planar harmonic mappings and their properties, *Kodai Mathematical Journal*, **40** (2017), no. 2, 278–288.

SCIE, Print ISSN: 0386-5991, Online ISSN: 1881-5472.

2016

(10) Sushil Kumar, **Sumit Nagpal** and V. Ravichandran, Coefficient inequalities for Janowski starlikeness, *Proceedings of the Jangjeon Mathematical Society*, **19** (2016), no. 1, 83–100.

Scopus, ISSN: 1598-7264.

2015

(11) **Sumit Nagpal** and V. Ravichandran, Convolution Properties of harmonic Koebe function and its connection with 2-starlike mappings, *Complex Variables and Elliptic Equations*, **60** (2015), no. 2, 191–210.

SCIE, Print ISSN: 1747-6933, Online ISSN: 1747-6941.

(12) R. Mendiratta, **Sumit Nagpal** and V. Ravichandran, On a subclass of strongly starlike functions associated with exponential function, *Bulletin of the Malaysian Mathematical Sciences Society*, **38** (2015), no. 1, 365–386.

SCIE, Print ISSN : 0126-6705, ISSN : 2180-4206 (Online).

(13) Rajni Mendiratta, **Sumit Nagpal** and V. Ravichandran, Radii of starlikeness and convexity for analytic functions with fixed second coefficient satisfying certain coefficient inequalities, *Kyungpook Mathematical Journal*, **55** (2015), no. 2, 395–410.

Scopus/ ESCI, Online ISSN : 0454-8124.

(14) Rajni Mendiratta, **Sumit Nagpal** and V. Ravichandran, Second-order differential superordination for analytic functions with fixed initial coefficient, *Southeast Asian Bulletin of Mathematics*, **39** (2015), no. 6, 851–864.

ESCI, Print ISSN: 0129-2021, Online ISSN: 0219-175X.

2014

(15) **Sumit Nagpal** and V. Ravichandran, A subclass of close-to-convex harmonic mappings, *Complex Variables and Elliptic Equations* **59** (2014), no. 2, 204–216.

SCIE, Print ISSN: 1747-6933, Online ISSN: 1747-6941.

(16) **Sumit Nagpal** and V. Ravichandran, Univalence and convexity in one direction of the convolution of harmonic mappings, *Complex Variables and Elliptic Equations* **59** (2014), no. 9, 1328–1341.

SCIE, Print ISSN: 1747-6933, Online ISSN: 1747-6941.

(17) Rajni Mendiratta, **Sumit Nagpal** and V. Ravichandran, A subclass of starlike functions associated with left-half of the lemniscate of Bernoulli, *International Journal of Mathematics* **25** (2014), no. 9, 1450090, 17 pp.

SCIE, Print ISSN: 0129-167X, Online ISSN: 1793-6519

(18) **Sumit Nagpal** and V. Ravichandran, Construction of subclasses of univalent harmonic mappings, *Journal of the Korean Mathematical Society* **51** (2014), no. 3, 567–592.

SCIE, Print ISSN: 0304-9914, Online ISSN: 2234-3008.

(19) O. P. Ahuja, **Sumit Nagpal** and V. Ravichandran, Radius constants for functions with the prescribed coefficient bounds, *Abstract and Applied Analysis* **2014**, Art. ID 454152, 12 pp.

Scopus, Print ISSN: 1085-3375, Online ISSN: 1687-0409

(20) **Sumit Nagpal** and V. Ravichandran, A comprehensive class of harmonic functions defined by convolution and its connection with integral transforms and hypergeometric functions, *Studia Universitatis Babes-Bolyai Mathematica* **59** (2014), no. 1, 41–55.

Scopus/ ESCI, Print ISSN: 0252-1938, Online ISSN: 2065-961X

(21) **Sumit Nagpal** and V. Ravichandran, Starlikeness, convexity and close-to-convexity of harmonic mappings, Current Topics in Pure and Computational Complex Analysis (M. Dorff, S. B. Joshi, I. Lahiri, editors), Trends in Mathematics, 2014, pp. 201-214 (Publisher: Springer).

Scopus, Print ISBN: 978-81-322-2112-8, Online ISBN: 978-81-322-2113-5.

2013

(22) **Sumit Nagpal** and V. Ravichandran, Fully starlike and fully convex harmonic mappings of order α, *Annales Polonici Mathematici* **108** (2013), no. 1, 85-107.

SCIE, Print ISSN: 0066-2216, Online ISSN: 1730-6272.

2012

(23) **Sumit Nagpal** and V. Ravichandran, Applications of the theory of differential subordination for functions with fixed initial coefficient to univalent functions, *Annales Polonici Mathematici* **105** (2012), no. 3, 225-238.

SCIE, Print ISSN: 0066-2216, Online ISSN: 1730-6272.

2011

(24) Rosihan M. Ali, **Sumit Nagpal** and V. Ravichandran, Second-order differential subordination for analytic functions with fixed initial coefficient, *Bulletin of the Malaysian Mathematical Sciences Society* (2) **34** (2011), no. 3, 611-629.

SCIE, Print ISSN : 0126-6705, Online ISSN : 2180-4206.

RESEARCH PROJECTS

- Principal investigator of a one-year Innovation Project "Private Coaching verses Classroom Teaching in Schools/ Universities" awarded by University of Delhi. The grant for this project is Rs. 3.5 Lakhs.
- Principal Investigator of three-year Star Innovation Project "Taking the work of Ramanujan to next level: An Innovation Project in Cryptography" by the University of Delhi. The grant for the same is about Rs. 16 Lakhs.

CONTENT DEVELOPMENT

- Member of the committee (for Analysis) formed by the Department Council of the Department of Mathematics, University of Delhi to revise Under-graduate syllabus under UGCF-2022 in view of NEP implementation in the University from the academic session 2022-23.
- Member of the Block Preparation Team in the course MMT-005 entitled Complex Analysis (ISBN: 978-93-89969-18-4) as a part of M. Sc. Programme of School of Sciences, Indira Gandhi National Open University (IGNOU) and contributed the following FOUR units:
  (a) Unit-3: Elementary Functions
  (b) Unit-6: Power Series
  (c) Unit-9: Conformal Mappings
  (d) Unit-10: Applications of Harmonic Functions and Conformal Mapping to Physical Problems

PAPER PRESENTATIONS/ INVITED TALKS

(1) Presented a paper entitled "Some techniques of construction univalent harmonic mappings" in SERB-DST Sponsored National Conference on "Advances in Mathematical Analysis and its Applications (NCAMAA-2019)" organized by the Department of Mathematics, PGDAV College, University of Delhi during November 8-10, 2019.

(2) Delivered an invited talk entitled "An introduction to Univalent Harmonic Mappings at the Mini Symposium in Mathematics held at Department of Mathematics, Deen Dayal Upadhyaya College, University of Delhi on 22-23 February 2019 under the DBT Star College Scheme.

(3) Presented a paper titled "Convolution Properties of harmonic Koebe Function and its connection with 2-starlike mappings" in the National Conference on Algebra, Analysis, Coding and Cryptography" (Sponsored by DRDO) organized by Department of Mathematics, University of Delhi, Delhi during 14-15 October 2016.

(4) Presented paper entitled "A subclass of close-to-convex harmonic mappings" in the National Seminar for Research Scholars held at Department of Mathematics, University of Delhi, during September 20-21, 2013.

(5) Presented paper entitled “Second-order differential subordination for analytic functions with fixed initial coefficient” in the National Seminar for Research Scholars held in Department of Mathematics, University of Delhi, during March 24-25, 2012.

PARTICIPATION IN CONFERENCES/ SEMINARS/ WORKSHOPS

(1) Participated in the three-day National Level Webinar on “Conqueringless attended areas in NAAC and Outcome based Education” organized by IQAC Cluster India and White Code Technologies Pvt. Ltd. in association with Jagadamba Mahavidyalaya, Achalpur City and Atul VidyaMandir Wardhas Rajarshee Shahu Science College, Chandur Rlyduring during June 1-3, 2020.

(2) Participated in two-day webinar on “R Software” organized by UniversityDepartment of Mathematics, Tilka Manjhi Bhagalpur University (TMBU), Bhagalpur during June 6-7, 2020.

(3) Participated in one-week FDP on “Moodle Learning Management System” organized by Bhopal Rao Pawar Government Polytechnic, Dhamtari, Chattisgarh in association with Spoken Tutorial Project, IIT Bombay during June 18-24, 2020.

(4) Participated in the five-day FDP on “Innovative Teaching Learning Methodologies” conducted by CIT-TLC (Coimbatore Institute of Technology-Teaching Leaning Centre) during July 6-10, 2020.

(5) Participated in One-week Faculty Development Programme on “LaTeX and Xfig organized by IQAC, A.N. College, Patna in association with IIT Bombay through Spoken Tutorial, Remote Learning (an initiative of National Mission on Education through ICT, MHRD, Govt. of India) during May 11-17, 2020.

(6) Participated in one-week Teacher Enrichment Workshop on “Linear Algebra, Coding Theory and Cryptography” organised by Janki Devi Memorial College, University of Delhi and sponsored by National Centre for Mathematics, a joint centre of IIT Bombay and TIFR, Mumbai during November 18-23, 2019.

(7) Successfully completed the 4-Week UGC-Sponsored Orientation Programme OR-91 from November 1, 2017 to December 19, 2017 and obtained “A” grade organized by Centre for Professional Development in Higher Education (CPDHE), University of Delhi.

(8) Participated in Faculty Development Program in “Research Project Management: Proposal to publication and beyond” organized by CIC-Centre for Science Education and Communication, University of Delhi on 19th July 2016.

(9) Participated in the “Capacity Building Workshop” on e-content creation in Mathematics organized by Institute of LifeLong Learning (ILLL), University of Delhi on 28th October 2016.

(10) Participated in the NAAC-Sponsored National Seminar on Strategies for Implementing Best Practices in Teaching, Learning and Evaluation, organized by the IQAC of Seva Mandal Education Society’s Dr. Bhanuben Mahendra Nanavati College of Home Science (NAAC Reaccredited “A” Grade, CGPA 3.64/4), Matunga, Mumbai on 2-3 March 2016.

(11) Participated in the National Faculty Development Programme on “Reflections on Emerging Pedagogy in Higher Education and Qualitative Research” organized by Department of Commerce, Ramanujan College from November 18th to 24th, 2015.

(12) Participated in the Two-day Workshop on “Innovative Teaching Methodologies” on January 15-16, 2015, conducted by CPDHE, University of Delhi.

(13) Participated in three day training program for "Matlab Fundamentals" from 17th to 19th November, 2014 conducted by Mathworks at Delhi University Computer Centre.

(14) Participated in the workshop on "Information Literacy and Competency" organized by Delhi University Library System, University of Delhi on 17 January 2013.

(15) Participated in the international conference "The Legacy of Srinivasa Ramanujan" organized by University of Delhi from 17-22 December 2012.

(16) Participated in Instructional School for Lecturers (ISL) in "Real Analysis and Measure Theory" from March 26 to April 7, 2012.

(17) Participated in Advanced Training in Mathematics for Lecturers (ATML) in "Geometric Complex Analysis" from March 21, 2011 to April 2, 2011.

(18) Participated in Advanced Training in Mathematics for Lecturers (ATML) in "Real Analysis" from March 22, 2010 to April 3, 2010.

(19) Participated in National Meet on History of Mathematical Sciences, held in University of Delhi, from 7-9 January 2010.

CONFERENCES/ REFRESHER COURSE/ INDUCTION ORGANIZATION

(1) Convenor, Induction/ Orientation Programme, organized by Teaching Learning Centre, Ramanujan College during 1–30 September 2021.

(2) Committee Member, Two-week Refresher Course in Mathematics, organized by Department of Mathematics and Teaching Learning Centre, Ramanujan College during 31 August – 14 September 2021.

(3) Committee Member, Two-week Refresher Course in Mathematics, organized by Department of Mathematics and Teaching Learning Centre, Ramanujan College during 16–31 March 2021.

(4) Committee Member, Five-day workshop on "Recent Trends in Domination and Graph Labelling (RTDGL 2021)" organized by Department of Mathematics, Ramanujan College, University of Delhi in collaboration with Academy of Discrete Mathematics and Applications (ADMA) during 27-31 May 2021.

(5) Committee Member, Two-week FDP on "Managing online classes and co-creating MOOCs," organized by Teaching Learning Centre, Ramanujan College during 20 April–6 May 2020.

(6) Committee Member, UGC and SERB-DST funded "International Conference on Applicable Mathematics (ICAM 2019)" with theme Network Sciences at Ramanujan College, University of Delhi from 19th to 21st December 2019.

ADMINISTRATIVE RESPONSIBILITIES **[AT COLLEGE LEVEL]**

- Assistant Director, Teaching Learning Centre, Ramanujan College under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT), sponsored by the Ministry of Education (2017-22);
- Nodal Officer, NIRF, Ramanujan College (2021-22);
- Convenor, India Today Ranking, Ramanujan College (2021-22);
- Convenor, Time-Table and Workload Committee (2017-22);
- Convenor, Eco Club (2016-19);

- Convenor, Admission Committee (Mathematical Sciences) for the year 2016 and 2017;
- Convenor, Annual Day for the year 2017, 2018 and 2019;
- Convenor, Foundation Day for the year 2016 and 2021;
- Member, Fee Concession Committee/Scholarship and Awards Committee (2019-21);
- Member, Magazine, Prospectus, Annual Report and Handbook Committee (2019-21);
- Member of the IQAC (2015-2022);
- Member of Eco Club (2014-16);
- Member of the Foundation Day Committee for the year 2014 and 2015;
- Member, NIRF Committee (2016-21);
- Member, NAAC Committee (2015-22).