Curriculum Vitae

Geno Petkov Nikolov

Address

Faculty of Mathematics and Informatics
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Education

- **D.Sc. in Mathematics**, Sofia University St. Kliment Ohridski, Bulgaria, 2005
  Thesis: "Extremal Problems for Polynomials"
- **Ph.D. in Mathematics**, Sofia University St. Kliment Ohridski, Bulgaria, 1990
  Thesis: "Gaussian Quadrature Formulae of Birkhoff Type"
- **M.Sc. in Mathematics**, Sofia University St. Kliment Ohridski, Bulgaria, 1985
  Thesis: "A Comparison Theorem in the Theory of Quadrature Formulae"

Research Interests

Approximation Theory, Numerical Analysis, Quadrature and Cubature Fofmulae, Orthogonal Polynomials and Special Functions, Inequalities

Professional Experience

- **Professor**, Faculty of Mathematics and Informatics, Sofia University St. Kliment Ohridski, Sofia, Bulgaria, 2009-present
- **Associate Professor,** Faculty of Mathematics and Informatics, Sofia University St. Kliment Ohridski, Sofia, Bulgaria, 1998-2009
- **Assistant Professor**, Faculty of Mathematics and Informatics, Sofia University St. Kliment Ohridski, Sofia, Bulgaria, 1991-1998
- **Assistant Professor**, Higher School on Architecture and Civil Engineering, Sofia, Sofia, Bulgaria, 1990-1991

Teaching Experience

- **Professor**, Faculty of Mathematics and Informatics, Sofia University St. Kliment Ohridski, Sofia, Bulgaria, 20009-present
  Courses: Numerical Methods, Numerical Methods of Linear Algebra, Numerical Integration, Approximation Theory, Mathematics (for students in Economics)

Specializations Abroad and Visiting Positions

- 2019, Isaac Newton Institute of Mathematics, Cambridge, United Kingdom (2 months)
- 2016, Sao Jose do Rio Preto, State University of Sao Paolo, Brazil (1 month)
- 2000, University of South Carolina, Columbia, USA (3 months)
- 1999, University of Duisburg, Germany (1 month)
- 1997-1998, University of Bradford, United Kingdom (1 year), Fellowship of the Royal Society
- 1997, University of Duisburg, Germany (1 month)
- 1993, Technical University of Braunschweig, Germany (3 months)

List of Publications

1. G. Nikolov, On certain inequalities for real-root polynomials, *in*: "Mathematics and Education in Mathematics. Proceedings of 51th Spring Conference of the Union of Bulgarian Mathematicians, Tryavna, April 5-9, 2022", pp. 77-85, Union of Bulgarian Mathematicians, Sofia, 2022.
2. G. Nikolov and B. Petrova, On the regularity of certain three-row almost Hermitian incidence matrices, *Ann. Sofia Univ. Fac. Math. Inf.* **107** (2022), 131-137.
3. G. Nikolov, A. Shadrin, Markov-type inequalities and extreme zeros of orthogonal polynomials, *J. Approx. Theory* **271** (2021), 105644.
4. D. K. Dimitrov, I. Gadjev, G. Nikolov and R. Uluchev, Hardy's inequalities in finite dimensional Hilbert spaces, *Proceedings of the AMS* **149** (2021), no. 6, 2515-2529.
5. D. K. Dimitrov and G. P. Nikolov, A discrete weighted Markov-Bernstein inequality for sequences and polynomials, *J. Math. Anal. Appl.* **493** (2021), 124522.
6. G. Nikolov, Some inequalities for Chebyshev polynomials, *in:* "Constructive Theory of Functions, Sozopol 2019" (B. Draganov, K. Ivanov, G. Nikolov and R. Uluchev, Eds.), pp. 181-193, Prof. Marin Drinov Publishing House of BAS, Sofia, 2020.
7. G. Nikolov and R. Uluchev, Bounds for the extreme zeros of Laguerre polynomials, *in* "Numerical Methods and Applications. 9th International Conference, NMA 2018" (G. Nikolov, N. Kolkovska and K. Georgiev, Eds.), *LNCS* **11189** (2019), pp. 243-250, Springer, 2019.
8. A. Avdzhieva, V. Gushev and G. Nikolov, Definite quadrature formulae of order three based on the compound midpoint rule, *in* "Numerical Methods and Applications. 9th International Conference, NMA 2018" (G. Nikolov, N. Kolkovska and K. Georgiev, Eds.), *LNCS* **11189** (2019), pp. 227-234, Springer, 2019.
9. N. Kyurkchiev and G. Nikolov, Comments on some new classes of sigmoidal and activation functions. Applications, *Dynamic Systems and Applications* **28** (2019), no. 4, 789-808.
10. A. Avdzhieva and G. Nikolov, Defnite quadrature formulae of 5-th order with equidistant nodes, *Ann. Sofia Univ. Fac. Math. Inf.* **106** (2019), 101-115.
11. G. Nikolov, New bounds for the extreme zeros of Jacobi polynomials, *Proceedings of the AMS* **147** (2019), no. 4, 1541-1550.
12. G. Nikolov and A. Shadrin, On the Markov inequality in the L2-norm with the Gegenbauer weight, *Constr. Approx.* **49** (2019), 1-27.
13. A. Avdzhieva, V. Gushev and G. Nikolov, Definite quadrature formulae of order three with equidistant nodes, *Ann. Sofia Univ. Fac. Math. Inf.* **104** (2018), 155-170.
14. G. Nikolov and R. Uluchev, Estimates for the best constant in a Markov L_2-inequality with the assistance of computer algebra, *Ann. Sofia Univ. Fac. Math. Inf.* **104** (2018), 55-75.
15. D. Aleksov and G. Nikolov, Markov L_2 inequality with the Gegenbauer weight, *J. Approx. Theory* **225** (2018), 224-241.
16. G. Nikolov and A. Shadrin, Markov L2-inequality with the Laguerre weight, *in:* "Constructive Theory of Functions, Sozopol 2016" (K. Ivanov, G. Nikolov and R. Uluchev, Eds.), pp. 207-221, Prof. Marin Drinov Publishing House of BAS, Sofia, 2018.
17. N. Naidenov, G. Nikolov and A. Shadrin, On the largest critical value of $T_n^{(k)}$, *SIAM J. Math. Anal.* **50** (2018), no. 3, 2389-2408.
18. A. Avdzhieva and G. Nikolov, Asymptotically optimal definite quadrature formulae of 4-th order, *J. Comp. Appl. Math.* **311** (2017), 565-582.
19. G. Nikolov and A. Shadrin, On the L_2 Markov inequality with Laguerre weight, *in*: "Progress in Approximation Theory and Applicable Complex Analysis", pp. 1-17, Springer Optimization and Its Applications vol. **117**, Springer, 2017.

20. D. Aleksov, G. Nikolov and A. Shadrin, On the Markov inequality in the L_2-norm with the Gegenbauer weight, *J. Approx. Theory* **208** (2016), 9-20.

21. G. Nikolov and V. Pillwein, An extension of Turan's inequality, *Math. Inequal. Appl.* **18** (2015), 321-335.

22. A. Avdzhieva and G. Nikolov, Asymptotically optimal quadrature formulae in certain Sobolev classes, *Ann. Sofia Univ. Fac. Math. Inf.* **102** (2015), 1-30.

23. A. Alexandrov, H. Dietert, G. Nikolov and V. Pillwein, Proof of a conjecture of M. Patrick concerning Jacobi polynomials, *J. Math. Anal. Appl.* **428** (2015), 750-761.

24. G. Nikolov, Inequalities for ultraspherical polynomials. Proof of a conjecture of I. Rasa, *J. Math. Anal. Appl.* **418** (2014), 852-860.

25. G. Nikolov and A. Shadrin, Inequalities of Markov-Duffin-Schaeffer with a Majorant. II, *in*: "Constructive Theory of Functions, Sozopol 2013" (K. Ivanov, G. Nikolov and R. Uluchev, Eds.), pp. 175-197, Prof. Marin Drinov Publishing House of BAS, Sofia, 2014.

26. A. Avdzhieva and G. Nikolov, On certain asymptotically optimal quadrature formulae, *in*: "Advanced Research in Mathematics and Computer Science, Doctoral conference MIE 2014" (P. Sloup et al., Eds.), pp. 3-21, St. Kliment Ohridski University Press, Sofia, 2014.

27. G. Nikolov, On Turan's inequality for ultraspherical polynomials, *Ann. Sofia Univ. Fac. Math. Inf.* **101** (2013), 105-114.

28. G. Nikolov and A. Alexandrov, An inequality of Duffin-Schaeffer type for Hermite polynomials, *in*: "Constructive Theory of Functions, Sozopol 2010" (G. Nikolov and R. Uluchev, Eds.), pp. 9-20, Prof. Marin Drinov Publishing House of BAS, Sofia, 2012.

29. A. Avdzhieva and G. Nikolov, Numerical computation of Gaussian quadrature formulae for spaces of cubic splines with equidistant knots, *in*: "BGSIAM'12, Proceedings of the 7th meeting of the Bulgarian Section of SIAM" (A. Slavova, G. Nikolov and Kr. Georgiev, Eds.), pp. 28-38, 2012.

30. G. Nikolov and A. Shadrin, On Markov-Duffin-Schaeffer inequalities with a majorant, *in*: "Constructive Theory of Functions, Sozopol 2010" (G. Nikolov and R. Uluchev, Eds.), pp. 227-264, Prof. Marin Drinov Publishing House of BAS, Sofia, 2012.

31. G. Nikolov and A. Alexandrov, On the behaviour of Gegenbauer polynomials in the complex plane, *Results Math.* **62** (2012), no. 3-4, 415-428.

32. G. Nikolov and C. Simian, Gauss-type quadrature formulae for parabolic splines with equidistant knots, *in*: "Approximation and Computation. In Honor of Gradimir Milovanovic" (W. Gautschi, G. Mastroianni and Th. M. Rassias, Eds), pp. 207-229, Springer Optimization and Its Applications vol. **42**, Springer, 2011.

33. D. K. Dimitrov and G. P. Nikolov, Sharp bounds for the extreme zeros of classical orthogonal polynomials, *in:* "120 Years Faculty of Mathematics and Informatics", pp. 236-243, St. Kliment Ohridski University Press, 2011.

34. G. P. Nikolov, P. B. Nikolov, Gauss-type quadrature formulae for parabolic splines with equidistant knots, *East J. Approx.* **16** (2010), no. 3, 219-233.

35. D. K. Dimitrov and G. P. Nikolov, Sharp bounds for the zeros of classical orthogonal polynomials, *J. Approx. Theory* **162** (2010), no. 10, 1793-1804.

36. G. Nikolov, Cubature formulae for the disc using Radon projections, *East J. Approx.* **14** (2010), no. 4, 401-410.

37. V. Gushev and G. Nikolov, Modified product cubature formulae, *J. Comp. Appl. Math.* **224** (2009), 465-475.

38. V. Gushev and G. Nikolov, Formulae for calculation of normal probability, *in*: "Numerical Methods and Applications 2006" (T. Boyanov, S. Dimova, Kr. Georgiev and G. Nikolov, Eds.), pp. 369-377, Lecture Notes in Computer Science vol. **4310,** Springer, 2007.

39. G. Nikolov, Polynomial inequalities of Markov and Duffin-Schaeffer type, *in*: "Constructive Theory of Functions, Sozopol 2010" (B. Bojanov, Ed.), pp. 201-246, Prof. Marin Drinov Publishing House of BAS, Sofia, 2006.

40. G. Nikolov, An extension of an inequality of Duffin and Schaeffer, *Constr. Approx.* **21** (2005), 181-191.

41. G. Nikolov, An extension of an inequality of I. Schur, *Math. Nachr.* **278** (2005), no. 10, 1190-1205.

42. G. Nikolov, Inequalities of Duffin-Schaeffer type, II, *East J. Approx.* **11** (2005), no. 2, 147-168.

43. G. Nikolov, An extremal property of Hermite polynomials, *J. Math. Anal. Appl.* **290** (2004), 405-413.

44. G. Nikolov and R. Uluchev, Inequalities for real-root polynomials. Proof of a conjecture of Foster and Krasikov, *in:* "Approximation Theory: A Volume Dedicated to Borislav Bojanov" (D. K. Dimitrov, G. Nikolov and R. Uluchev, Eds.), pp. 201-216, Prof. Marin Drinov Academic Publishing House, Sofia, 2004.

45. G. Nikolov, Markov-type inequalities in the L_2-norms induced by the Chebycheff weights, *Arch. Inequal. Appl.* **1** (2003), 361-376.

46. G. Nikolov, The Christoffel function for the Hermite weight is bell-shaped, *J. Approx. Theory* **125** (2003), no. 2, 145-150.

47. G. Nikolov, Snake polynomials and Markov-type inequalities, *in*: "Approximation Theory: A volume dedicated to Blagovest Sendov" (B. Bojanov, Ed.), pp. 342-352, Darba, Sofia, 2002.

48. B. Bojanov, W. Haussmann and G. Nikolov, Bivariate polynomials of least deviation from zero, *Canad. J. Math.* **53** (2001), no. 3, 489-505.

49. G. Nikolov, Inequalities of Duffin-Schaeffer type, *SIAM J. Math. Anal.* **33** (2001), no. 3, 686-698.

50. G. Nikolov, On the weights of nearly Gaussian quadrature formulae, *East J. Approx.* **7**(2001), no. 1, 115-120.

51. V. Gushev, and G. Nikolov, Some cubature formulae using mixed type data, *in*: "Recent Progress in Multivariate Approximation" (W. Haussman, K. Jetter and M. Reimer, Eds.), pp. 163-184, International Series of Numerical Mathematics vol. **137**, Springer, 2001.

52. G. Nikolov, An inequality for polynomials with elliptic majorant, *J. Inequal. Appl.* **4** (1999), 315-325.

53. B. D. Bojanov, D. P. Dryanov, W. Haussmann and G. P. Nikolov, Best one-sided L_1 approximation by blending functions, *in*: "Advances in Multivariate Approximation" (W. Haussmann, K. Jetter and M. Reimer, Eds.), pp. 85-106, Mathematical Research vol. 107, Willey-VCH, 1999.

54. D. B. Hunter and G. Nikolov, Gegenbauer weight functions admitting L_2 Duffin and Schaeffer type inequalities, *in*: "Application and Computation of Orthogonal Polynomials" (W. Gautschi, G. H. Golub and G. Opfer, Eds.), pp. 122-131, International Series of Numerical Mathematics vol. **131,** Birkhauser, Basel, 1999.

55. D. Hunter and G. Nikolov, On the error term of symmetric Gauss-Lobatto quadrature formulae for analytic functions, *Math. Comp.* **69** (1999), no. 229, 269-282.

56. G. Nikolov, An inequality of Duffin-Schaeffer-Schur type, *Ann. Sofia Univ. Fac. Math. Inf.* **90** (1998), 109-123.

57. D. B. Hunter and G. Nikolov, Gaussian quadrature of Chebyshev polynomials, *J. Comp. Appl. Math.* **94** (1998), 123-131.

58. K.-J. Foerster, P. Koehler and G. Nikolov, Monotonicity and stopping rules for compound Gauss-type quadrature formulae, *East J. Approx.* **4** (1998), no. 1, 55-74.

59. G. Nikolov, On certain Duffin and Schaeffer type inequalities, *J. Approx. Theory* **93** (1998), no. 1, 157-176.

60. L. Milev and G. Nikolov, On the inequality of I. Schur, *J. Math. Anal. Appl.* **216** (1997), no. 2, 421-437.

61. G. Nikolov, On the remainder of the Gauss-Lobatto quadrature formula associated with the second Chebyshev weight, *in*: "Proceedings of the Sixth International Colloquium on Numerical Analysis and Computer Science with Applications" (E. Minchev, Ed.), pp. 137-144, Academic Publications, 1997.

62. B. Bojanov and G. Nikolov, Duffin and Schaeffer type inequality for ultraspherical polynomials, *J. Approx. Theory* **84** (1996), no. 2, 129-138.

63. G. Nikolov, On certain definite quadrature formulae, *J. Comp. Appl. Math.* **75** (1996), 329-343.

64. G. Nikolov, Asymptotically optimal definite quadrature formulae, *ZAMM* **75,** SII (1995), 653-654.

65. P. Koehler and G. Nikolov, Error bounds for Gauss type quadrature formulae related to spaces of splines with equidistant knots, *J. Approx. Theory* **81** (1995), no. 3, 368-388.

66. P. Koehler and G. Nikolov, Error bounds for optimal definite quadrature formulae, *J. Approx. Theory* **81** (1995), no. 3, 397-405.

67. G. Nikolov, Exit criteria and monotonicity of the remainders of Euler-Maclaurin quadrature formulae, *in*: "Open Problems in Approximation Theory" (B. Bojanov, Ed.), pp.156-162, Science Culture Publishing, Singapore, 1994.

68. G. Nikolov, Gaussian quadrature for splines, *in*: "Numerical Integration, IV" (G. Hammerlin and H. Brass, Eds.), International Series in Numerical Mathematics vol. 112, Birkhauser, Basel, 1993.

69. G. Nikolov, On the monotonicity of sequences of quadrature formulae, *Numer. Math.* **62** (1992), 557-565.

70. B. Bojanov and G. Nikolov, Comparison of Birkhoff type quadrature formulae, *Math. Comp.* **54** (1990), no. 190, 627-648.

71. G. Nikolov, Existence and uniqueness of Hermite-Birkhoff Gaussian quadrature formulas, *Calcolo* **26** (1989), no. 1, 41-59.

72. G. Nikolov, A comparison theorem in the theory of quadrature formulae, *Math. Balkanica* **2** (1988), no. 2, 3-10.

73. G. Nikolov and R. Uluchev, A comparison theorem for Tchebysheff polynomials, *SERDICA Bulg. math. publ*. **14** (1988), 95-97.

Presentations and Conference Contributions (selected/recent)

1. New bounds for the extreme zeros of classical orthogonal polynomials
10th International Conference Numerical Methods and Applications
August 22-26, 2022, Borovets, Bulgaria

2. On the relative extrema of $T_n^{(k)}$ *(with N. Naidenov)*
FMI Spring Scientific Session,
March 26, 2022, Sofia (Bulgaria)

3. On certain inequalities for real-root polynomials (Plenary talk)
51th Spring Conference of the Union of Bulgarian Mathematicians
April 5-9, 2022, Tryavna (Bulgaria)

4. On the relative extrema of $T_n^{(k)}$ *(with N. Naidenov)*
9th CMAPT Workshop, Computational Mathematics and APproximation Theory
June 13-17, 2022, Strobl/St. Wolfgang (Austria)

5. Some inequalities for Chebyshev polynomials. Supplement to the Finite Increment Theorem
FMI Spring Scientific Session
March 27, 2021, Sofia (Bulgaria)

6. Markov type inequalities and extreme zeros of orthogonal polynomials (Plenary Talk)
15th Annual Meeting of the Bulgarian Section of SIAM
December 15-17, 2020, Sofia (Bulgaria)

7. On the sharp constant in the L_2 Hardy inequality in certain finite dimensional spaces (*with D.K. Dimitrov, I. Gadjev and R. Uluchev*)
ICNAAM 2019, 17th International Conference of Numerical Analysis and Applied Mathematics
September 23-28, 2019, Rhodes (Greece)

8. A discrete Markov-Bernstein inequality for sequences and polynomials (*with D.K. Dimitrov*)
8th CMAPT Workshop, Computational Mathematics and APproximation Theory
August 24-28, 2019, Strobl/St. Wolfgang (Austria)

9. New bounds for the extreme zeros of classical orthogonal polynomials
15th International Symposium on Orthogonal Polynomials, Special Functions and Applications
July 22-26, 2019, Hagenberg (Austria)

10. Markov-type inequalities and extreme zeros of orthogonal polynomials
Approximation, sampling, and compression in high dimensional problems
July 17-21, 2019, Cambridge, United Kingdom

11. A discrete Markov-Bernstein inequality for sequences and polynomials (*with D. K. Dimitrov*)
International Conference "Constructive Theory of Functions"
June 02-08, 2019, Sozopol (Bulgaria)

12. A class of polynomial inequalities and extreme zeros of orthogonal polynomials
7th CMAPT Workshop, Computational Mathematics and APproximation Theory
September 02-08, 2018, Sozopol (Bulgaria)

13. A class of polynomial inequalities and extreme zeros of orthogonal polynomials
IX Jaen Conference on Approximation
July 08-13, 2018, Ubeda (Spain)

14. Markov inequalities in L_2 norms with the Gegenbauer weights
14th Serbian Mathematical Congress
May 16-19, 2018, Kragujevac (Serbia)

15. On the Markov L_2 inequality with the Laguerre weight
Workshop "Approximation and Numerical Methods"
October 19-22, 2017, Streltcha (Bulgaria)

16. Markov L_2 inequality with the Gegenbauer weight
6th CMAPT Workshop, Computational Mathematics and APproximation Theory
September 05-09, 2017, Linz (Austria)

17. Markov-type inequalities with a majorant
Seminar on Approxiation Theory
September 28, 2016, Sao Jose do Rio Preto (Brasil).

18. Markov-type inequality in the L_2 norm induced by the Laguerre weight (*with A. Shadrin*)
International Conference "Constructive Theory of Functions"
June 11-17, 2016, Sozopol (Bulgaria)

Editorial Work

1. "Constructive Theory of Funcions, Sozopol 2019" (B. Draganov, K. Ivanov, G. Nikolov and R. Uluchev, Eds.), Prof. Marin Drinov Publ. House BAS, Sofia, 2020.
2. "Numerical Methods and Applications. 9th International Conference, NMA 2018" (G. Nikolov, N. Kolkovska, K. Georgiev, Eds), *LNCS* **11189**, Springer, 2019.
3. "Constructive Theory of Funcions, Sozopol 2016" (K. Ivanov, G. Nikolov and R. Uluchev, Eds.), Prof. Marin Drinov Acad. Publ. House, Sofia, 2018.
4. "Constructive Theory of Funcions, Sozopol 2013: A Volume Dedicated to Blagovest Sendov and to the Memory of Vasil Popov" (K. Ivanov, G. Nikolov and R. Uluchev, Eds.), Prof. Marin Drinov Acad. Publ. House, Sofia, 2014.
5. "Constructive Theory of Funcions, Sozopol 2010: In Memory of Borislav Bojanov" (G. Nikolov and R. Uluchev, Eds.), Prof. Marin Drinov Acad. Publ. House, Sofia, 2011.
6. "Approximation Theory: A Volume Dedicated to Borislav Bojanov" (D. K. Dimitrov, G. Nikolov and R. Uluchev, Eds.), Prof. Marin Drinov Acad. Publ. House, Sofia, 2004.

Scientific Projects (selected)

1. Theory and Algorithms for Approximation with Polynomials and Splines, 2019-2022
   Bilateral project KP-06-Austria/8/2019 (WTZ BG 03/2019), funded by Bulgarian National Science Fund and OeAD (Austria).
2. Low-Rank, Polynomial and Spline Approximations and Applications, 2017-2019
   Bilateral project DNTS Austria 01/3, funded by Bulgarian National Science Fund and OeAD (Austria).
3. Research in Pairs, 2016, Grant 1615p
   Funded by the Leibnitz Foundation
4. Contemporary Methods in Constructive Theory of Functions, 2016-2019
   Grant DN 02/14, funded by the Bulgarian National Science Fund, Ministry of Education and Science.
5. Effective Methods and Algorithms for Geometric Modelling, 2012-2014,
   Grant DFNI-T01/0001, funded by the Bulgarian National Science Fund, Ministry of Education and Science.
6. Modern Methods in Approximation Theory, 2010-2013 (Project Coordinator)
   Grant DDVU 02/30, funded by the Bulgarian National Science Fund, Ministry of Education and Science.
7. Extremal Problems in Approximation Theory, 2004-2007
   Grant MM-1402/2004, funded by the Bulgarian National Science Fund, Ministry of Education and Science.
8. SCOPUS Joint Project "New Methods for Quadrature", 2004-2007
   Funded by the Swiss Scientific Foundation