

RESEARCH PROFILE:

1. Sarfraz, M. Butt, S. & Hussain, M. Z. (1994), Interpolation for the positive data using rational cubics, Proc. ISOSS-IV August 27-31, Lahore, Pakistan, Vol. 8, 251-261.
2. Hussain, M. Z. & Butt, S.(1995), Positivity preserving using rational cubics, *Punjab University Journal of Mathematics*, Vol. 28, 167-178.
3. Butt, S., Hussain, M. Z. & Sarfraz, M. (1996), Locally constructed C^2 spline, *Punjab University Journal of Mathematics*, Vol. 29, 73-79.
4. Sarfraz, M. Butt, S. & Hussain, M. Z. (1996), Surfaces for the visualization of scientific data preserving monotonicity, Proc. IMA Mathematics of Surfaces VII Conference, September 2-5, Dundee, U.K, 479-495.
5. Butt, S., Sarfraz, M. & Hussain, M. Z. (1996), Modeling for the visualization of scientific data preserving monotonicity, Mini symposium on Computer Simulation and its Application. KFUPM, Saudi-Arabia.
6. Hussain, M. Z., Sarfraz, M., & Butt, S., (1997), Non-negative rational spline interpolation, Proc. IEEE International Conference on Information Visualization (IV'97), August 27-29, London, UK, 200-204.
7. Sarfraz, M., Butt, S., and Hussain, M. Z. (1997), Simulating a Model for the Scientific Data, Proc. International Conference on Operations and Quantitative Management, January 3-5, Jaipur, India 267-274.
8. Sarfraz, M., Hussain, M. Z. & Butt, S., (2000), A rational spline for visualizing Positive data, Proc. IEEE International Conference on Information Visualization, July 19-21, London, UK, 57-62.
9. Butt S., Hussain, M. Z. & Sarfraz, M., (2001), Constrained interpolation, *Punjab University Journal of Mathematics*, Vol. 34, 65-76.
10. Sarfraz, M., Butt, S. & Hussain, M. Z. (2001), Visualization of shaped data by rational cubic spline interpolation, *Computers & Graphics*, Vol. 25(5), 833-845.
11. Sarfraz, M., Hussain, M. Z. & Chaudhry, F. S., (2005), Shape preserving data visualization with cubic splines, Proc. GMVAG 2005, July 21-26, 2005, Utah, U.S.A.
12. Sarfraz, M., Hussain, M. Z. & Chaudhry, F. S. (2005), Shape preserving cubic spline for data visualization, *Computer Graphics and CAD/CAM* Vol. 1(6), 185-193.
13. Sarfraz, M. & Hussain, M. Z. (2006), Data visualization using rational spline interpolation *Journal of Computational and Applied Mathematics* Vol. 189, 513-525.
14. Hussain, M. Z. & Maria Hussain (2006), Visualization of data subject to positive constraints, *Journal of Information and Computing Science*, Vol. 1(3), 149-160.
15. Yahaya, S. H., Hussain, M. Z. and Jamaludin, M. A. (2006), Visualization of scientific data by a Bezier-like quartic interpolation, Proc. 2nd IMT-GT Regional Conference on Mathematics, Statistics and Applications, July13-15, University Sains Malaysia, Penang, 1-12.
16. Hussain, M. Z. & Maria Hussain (2006), Monotonic surfaces for computer graphics, *Journal of Prime Research in Mathematics*, Vol. 2, 170-186.

17. Hussain, M. Z. & Jamaludin (2006), Postivity-preserving piecewise rational cubic interpolation, *Matematika*, Vol. 22(2), 147-153.
18. Hussain, M. Z. & Maria Hussain (2006), Visualization surface data using rational bicubic spline, *Punjab University Journal of Mathematics*, Vol. 38, 83-97.
19. Hussain, M. Z. & Maria Hussain (2007), Visualization of 3D data preserving convexity, *Journal of Applied Mathematics and Computing*, Vol. 1(2), 397-410.
20. Hussain, M. Z. & Maria Hussain (2007), Visualization of data preserving monotonicity, *Applied Mathematics and Computation*, Vol. 190, 1353-1364.
21. Hussain, M. & Hussain, M. Z. (2008), Convexity preserving rational bicubic interpolation, *Computer Graphics and CAD/CAM*, Vol. 2 (1-6), 14-24.
22. Hussain, M. Z. & Sarfraz, M. (2008), Positivity-preserving interpolation of positive data by rational cubics, *Journal of Computation and Applied Mathematics*, Vol. 218, 446-458.
23. Hussain, M. Z. & Hussain M. (2008), Convex Surface Interpolation, *Lecture Notes in Computer Science* 4975, 475-482.
24. Hussain, M. Z., Hussain, M. & Samreen, S. (2008), Visualization of shaped data by rational quartic spline interpolation, *International Journal of Applied Mathematics & Statistics*, Vol. 13(J.08), 34-46.
25. Hussain, M. Z., Sarfraz, M. & Hussain, M. (2008), Visualization of constrained data by rational cubics, *European Journal of Scientific Research*, Vol. 31(1), 212-228.
26. Hussain, M. Z., Hussain, M. & Tahira, S. S. (2008), Shape preserving convex data visualization using rational bi-quartic function, *European Journal of Scientific Research*, Vol. 31(2), 319-327.
27. Hussain, M. Z. & Hussain, M. (2009) Shape preserving scattered data interpolation, *European Journal of Scientific Research*, Vol. 25(1), 151-164.
28. Hussain, M. Hussain, M. Z., & Randriambeloso, G. (2009), Measurement of accuracy of rational cubic function, *Italian Journal of Pure and Applied Mathematics*, Vol. 25, 143-156.
29. Hussain, M. Z. & Sarfraz, M. (2009), Monotone piecewise rational cubic interpolation, *International Journal of Computer Mathematics*, Vol. 6(3), 423-430.
30. Hussain, M. Hussain, M. Z., & Cripps, R. J. (2009), C^2 rational quintic function, *Journal of Prime Research in Mathematics*, Vol. 5, 115-123.
31. Hussain, M. Z., Zaidi, D., Hussain, M. & Majid, A. A. (2009), Monotone surface data visualization, *European Journal of Scientific Research*, Vol. 38(3), 351-361.
32. Hussain, M. Z. & Hussain, M. (2010), C^1 positive scattered data interpolation, *Computers and Mathematics with Applications*, Vol. 59, 457-467.
33. Cripps, R. J., Hussain, M. Z. & Zhu, S. (2010), Smooth polynomial approximation of spiral arcs, *Journal of Computation and Applied Mathematics*, Vol. 233, 2227-2234.
34. Sarfraz, M., Hussain, M. Z. & Nisar, A. (2010), Positive data modeling using spline function, *Applied Mathematics and Computation*, Vol. 216, 2036-2049.
35. Hussain, M. Z., Sarfraz, M. & Hussain, M. (2010), Scientific data visualization with shape preserving C^1 rational cubic interpolation, *European Journal of Pure and Applied Mathematics*, Vol. 3(2), 194-212.

36. Hussain, M. Z. , Hussain, M. & Sarfraz, M. (2010), Visualization of monotone data by rational bi-cubic interpolation, *Transactions on Computational Science VIII, LNCS 6260*, 146-155.
37. Hussain, M. Z. & Hussain, M. (2010), C^1 monotone scattered data interpolation, *Transactions on Computational Science VIII, LNCS 6260*, 156-166.
38. Hussain, M. Z., Fareeha Saadia & Maria Hussain (2010), Convex surface visualization using rational bi-cubic function, *Iranian Journal of Optimization*, Vol. 3, 420-446.
39. Srafraz, M., Hussain, M. Z., Irshad, M. & Ayesha, K. (2010), Approximating boundary of bitmap characters using genetic algorithm , Proc. IEEE Seventh International Conference on Computer Graphics, Imaging and Visualization, August, 07-10 , Sydney, Australia, 86-91.
40. Hussain, M. Z. & Maria Hussain (2011), C^1 positivity preserving scattered data interpolation using rational Bernstein-Bézier triangular patch, *Journal of Applied Mathematics and Computing*, Vol.35(1-2),281-293.
41. Srafraz, M., Hussain, M. Z., Tahira, S. S. & Rabia, I. (2011), Data visualization using shape preserving C^2 rational spline, Proc. IEEE 15th International Conference on Information Visualization, July 13-15, London, UK, 528-533.
42. Hussain, M. Z., Sarfraz, M. & Shakeel, A (2011), Shape preserving surfaces for the visualization of positive and convex data using rational bi-quadratic splines, *International Journal of Computer Applications*, Vol. 27(10), 12-20.
43. Hussain, M. Z., Srafraz, M., Madiha, A. S. & Irshad, M. (2011), Rational bi-cubic functions preserving 3D positive data, Proc. IEEE 8th International Conference on Computer Graphics, Imaging and Visualization, August 16-19, Singapore, 47-52.
44. Hussain, M.Z. Sarfraz, M. & Tahira, S. S. (2011), Shape preserving rational cubic spline for positive and convex data, *Egyptian Informatics Journal*, Vol. 12, 231-236.
45. Tahira, S. S. Sarfraz, M. & Hussain, M. Z. (2011), Shape preserving constrained data visualization using rational functions, *Journal of Prime Research in Mathematics*, Vol. 7, 35-51.
46. Irshad, M., Irfa, E. & Hussain, M. Z. (2011), Detecting corners for 3D objects, *International Journal of Computer Vision and Image Processing*, Vol. 1(4), 58-67.
47. Hussain, M. Z. & Saima B. (2011), Shape preserving surface data visualization using rational bi-cubic functions, *Journal of Numerical Mathematics*, Vol. 19(4), 267-307.
48. Sarfraz, M., Hussain, M. Z. & Hussain, M. (2012), Shape preserving curve interpolation, *International Journal of Computer Mathematics*, Vol. 89(1), 35-53.
49. Tahira, S. S., Sarfraz, M. & Hussain, M. Z. (2012), Shape preserving positive and convex data visualization using rational bi-cubic functions, *Pakistan Journal of Statistics and Operation Research* , Vol.8(1), 121-138.
50. Sarfraz, M., Hussain, M. Z. & Arfan Ali, M., (2012), Positivity-preserving scattered data interpolation scheme using the side- vertex method, *Applied Mathematics and Computation*, Vol. 218, 7898-7910.

51. Cripps, R. J., Hussain, M. Z., (2012), C^1 monotone cubic Hermite interpolation, *Applied Mathematics Letters*, Vol. 25, 1161-1165.
52. Hussain, M. Z., Sarfraz, M. & Tahira, S. S., (2012), Monotone data visualization using rational functions, *World Applied Sciences Journal*, Vol. 16(11), 1496-1508.
53. Sarfraz, M., Hussain, M. Z., Shehla Aslam & Maria Hussain, (2012), Monotony preserving scattered data interpolation scheme using side-vertex method, Proc. IEEE 16th International Conference on Information Visualization, July 10-13, Montpellier, France, 480-485.
54. Sarfraz, M., Irshad, M. & Hussain, M.Z., (2012), Vectorization of image outlines using rational spline and genetic algorithm, Proc. International Conference on Image, Vision and Computing, August 25-26, Shanghai, China, 16-20.
55. Maria Hussain, Hussain, M.Z. & Iram B. (2012), Shape properties of irregular surface data, *Pakistan Journal of Statistics and Operation Research*, Vol.8 (4), 801-820.
56. Farheen Butt, Maria Hussain, Hussain, M.Z. & A. A. Bhatti (2012), Positive data visualization using trigonometric function, *Journal of Applied Mathematics*, Vol. 2012, Article ID 247120, 19 pages.
57. Sarfraz, M., Irshad, M. & Hussain, M.Z. (2013), Reverse engineering of planer objects using GAs, *Sains Malaysiana* Vol. 42(8), 1167-1179.
58. Sarfraz, M., Hussain, M.Z. & Munaza, I. (2013), Modeling of objects using conic splines, *Journal of Software Engineering and Applications*, Vol. 6 (3B), 67-72.
59. Sarfraz, M., Hussain, M. Z. & Maria Hussain (2013), Modelling rational spline for visualization of shaped data. *Journal of Numerical Mathematics*, Vol. 21(1), 63-88.
60. Sarfraz, M., Hussain, M. Z. & Irshad, M. (2013), Reverse engineering of digital curve outlines using genetic algorithm, *International Journal of Computers*, Vol.7(1), 1-10.
61. Misbah, I., Sarfraz, M. & Hussain, M. Z. (2013), Genetic algorithm works for vectoring image of generic shapes , *Journal of Software Engineering and Applications* Vol. 6(7), 329-337.
62. Sarfraz, M., Irshad, M., Faiza S. & Hussain, M. Z. (2013), A novel approach for surface to surface intersection approximation, Proc. IEEE 17th International Conference on Information Visualization, July 15-18, London, UK., 482-487.
63. Farheen Butt, Maria Hussain & Hussain, M.Z. (2013), Rational trigonometric cubic spline to conserve convexity of 2D data, *Egyptian Informatics Journal*, Vol.14, 205-209..
64. Maria Hussain, Hussain, M.Z. & Sarfraz, M. (2013), Data visualization using spline functions, *Pakistan Journal of Statistics and Operation Research*, Vol.9 (2), 181-203.
65. Maria Hussain, Hussain, M.Z. & Maryam Buttar (2014), C^1 positive Bernstein-Bezier rational quartic interpolation, *International Journal of Mathematical Models and Methods in Applied Sciences*, Vol. 8, 9-21.
66. Hussain, M. Z., Maria Hussain, & Amna Waseem (2014), Shape-preserving trigonometric functions, *Computational and Applied Mathematics*, Vol. 33, 411-431.

67. Farheen Butt, Maria Hussain & Hussain, M.Z. (2014), Monotone data visualization using rational trigonometric spline interpolation, *The Scientific World Journal* , Vol. 2014, Article ID 602453, 14 pages.
68. Maria Hussain, Ahmad Abd. Majid & Hussain, M.Z. (2014), Convexity-preserving Bernstein–Be´zier quartic scheme, *Egyptian Informatics Journal*, Vol. 15, 89-95.
69. Hussain, M. Z., Sarfraz, M., Munaza, I. & Sadaf, Y. (2014), Two methods of object designing by rational splines, Proc. IEEE 18th International Conference on Information Visualization, July 15-118, Paris, France, 492-497.
70. Srafrz, M., Farsia Hussain. & Hussain, M. Z. (2014), Shape preserving rational trigonometric spline curves, Proc. IEEE 11th International Conference on Computer Graphics, Imaging and Visualization, August 6-8, Singapore, 47-52
71. Hussain, M. Z., Maria Hussain. & Beenish Aqeel (2014), Shape-preserving surfaces with constraints on tension parameters, *Applied Mathematics and Computation*, Vol. 247, 442-464.
72. Misbah, I., Sarfraz, M. & Hussain, M. Z. (2014), Outline capture of planar objects by detecting corner features, Computer Vision and Image Processing in Intelligent Systems and Multimedia Technologies, IGI Global, DOI: 10.4018/978-1-4666-6030-4.ch016, 280-298.
73. Sarfraz, M., Munaza, I. & Hussain, M. Z. (2015), Shape designing of engineering images using rational spline interpolation, *Advances in Materials Science and Engineering*, Vol. 2015, Article ID 260587, 9 pages.
74. Farheen Butt, Hussain, M. Z. & A. A. Bhatti (2015), C^1 positive surface over positive scattered data sites, *PLOS ONE* | 10(6): e0120658. DOI: 10.1371/journal.Pone.0120658.
75. Maria Hussain, Hussain, M. Z. , Aman Wassem & Moshayyadah Javaid (2015), GC^1 Shape-preserving trigonometric surfaces, *Journal of Mathematical Imaging and Vision*, Vol. 53, 21-41.
76. Srafrz, M. Hussain, M. Z. & Farisa Hussain (2015), Shape preserving curves using quadratic trigonometric spline, *Applied Mathematics and Computation*, Vol. 265, 1126-1144.
77. Sarfraz, M., Hussain, M. Z. & Farisa Hussain (2015), Shape preserving positive trigonometric surfaces , Proc. IEEE 19th International Conference on Information Visualization, July 21-25, Barcelona Spain, 424-429.
78. Irshad, M., Sarfraz, M. & Hussain, M. Z. (2015), Reverse engineering of planer objects using imperialist competitive algorithm, Proc. IEEE 19th International Conference on Information Visualization, July 21-25, Barcelona Spain, 430-435.
79. Hussain, M. Z., Irshad, M., Sarfraz, M. & Nousheen Zafar (2015), Interpolation of discrete time signals using cubic functions, Proc. IEEE 19th International Conference on Information Visualization, July 21-25, Barcelona Spain, 454-459.
80. Irshad, M., Khalid, S., Hussain, M. Z. & Sarfraz, M. (2016), Outline capturing using rational functions with the help of genetic algorithm, *Applied Mathematics and Computation*, Vol. 274, 661-678.
81. Hussain, M., Hussain, M. Z., & Sarfraz, M. (2016) Shape-preserving polynomial interpolation scheme, *Iranian Journal of Science and Technology, Transactions A: Science*, Vol. 40(1), 9-18.

82. Hussain, M. Z., Hussian, F. & Sarfraz, M. (2016) Shape-preserving, positive trigonometric spline curves, *Iranian Journal of Science and Technology, Transactions A: Science*, DOI10.1007/s40995-016-0056-1
83. Mahmood, H., Hussain, M. & Hussain, M. Z. (2016), A rational cubic trigonometric approximation scheme of the generalized cornu spirals, *Springer Plus*, DOI 10.1186/s40064-016-2544-3
84. Sarfraz, M., Samreen, S. & Hussain, M. Z. (2016), Modeling of 2D objects with weighted-quadratic trigonometric spline, Proc. IEEE 13th International Conference on Computer Graphics, Imaging and Visualization, March 29- April 1, Morocco, 29-34.
85. Hussain, M., Hussain, M. Z., & Sarfraz, M. (2016), Shape-preserving rational interpolation scheme for regular surface data, *International Journal of Applied and Computational Mathematics*, Vol. 2(4), 713-747.
86. Abbas, S., Hussain, M.Z. & Irshad, M. (2016), GA based rational cubic B-spline representation for still image interpolation, *Pakistan Journal of Statistics and Operation Research*, Vol. 12(4), 753-763.
87. Shakeel, A., Hussain, M. & Hussain, M. Z. (2016), Rational cubic spirals, *Journal of Prime Research in Mathematics*, Vol.12, 145-157
88. Abbas, S., Hussain, M.Z. & Irshad, M. (2017), Trigonometric spline for medical image interpolation, *Journal of the National Science Foundations of Sri Lanka*, in Press.
89. Hussain, M., Shakeel, A. & Hussain, M. Z. (2017), G^2 approximation hyperbolic arc by C-Bezier curve, *NED University Journal of Research*, in Press.
90. Abbas, S. Hussain, M. Z. & Irshad, M. (2017), Image interpolation by rational Ball cubic B-spline representation and genetic algorithm, *Alexandria Engineering Journal*, in press.