Professor M.P. Biswal

Brief Bio-Data

Personal Information

Full Name	**Dr. Mahendra Prasad Biswal**.
Nationality	**Indian**.
Present Position	**Professor & Former Head, Department of Mathematics, IIT Kharagpur**.
Present Pay Scale	**Professor HAG (Higher Administrative Grade)**.
Email	**mpbiswal@maths.iitkgp.ac.in, mpbiswal@gmail.com**.
Tel. No.	**+91-3222-283642(Office)**, +91-3222-283643(Residence).

Address

Present	**Department of Mathematics/ House No. A-80**. **Indian Institute of Technology**. **Kharagpur-721302, West Bengal, India**.
Permanent	**Durga Madhab Nagar,Sai Vihar**. **Sampur, Bhubneswar-751029, Odisha State, India**.

Educational Qualification

1979	**B.Sc (Maths-Hons)**, *Utkal University, Vani Vihar, Bhubaneswar, India*. First Class
1981	**M.Sc.(Mathematics)**, *Utkal University, Vani Vihar, Bhubaneswar, India*. First Class
1987	**Ph.D (Optimization-Mathematics)**, *Department of Mathematics, Indian Institute of Technology, Kharagpur*, Kharagpur-721302, India.

Ph.D Thesis

title	**Computational Study of Some Geometric Programming Problems**.

Teaching and Research Experience

Teaching and Research Experience as a Faculty Member in the Dept. of Mathematics, IIT Kharagpur: 1988-2021

2011–2021 **Professor-HAG (Higher Administrative Grade)**, *Department of Mathematics, Indian Institute of Technology Kharagpur*, Kharagpur-721302, India.

2016–2019 **Professor & Head of the Department**, *Department of Mathematics, Indian Institute of Technology Kharagpur*, Kharagpur-721302, India.

2003–2011 **Professor**, *Department of Mathematics, Indian Institute of Technology Kharagpur*, Kharagpur-721302, India.

1998–2003 **Associate Professor**, *Department of Mathematics, Indian Institute of Technology Kharagpur*, Kharagpur-721302, India.

1993-1998 **Assistant Professor**, *Department of Mathematics, Indian Institute of Technology Kharagpur*, Kharagpur-721302, India.

1988-1993 **Lecturer**, *Department of Mathematics, Indian Institute of Technology Kharagpur*, Kharagpur-721302, India.

Visiting Faculty for Foreign University

June, 1996–December, 1996 **Visiting Faculty**, *Department of Systems Engg. and Engg. Management, The Chinese University of Hong Kong, Hong Kong*.
Visiting Faculty under the active guidance of Prof. Duan Li

June, 2000-July, 2000 **Visiting Faculty**, *Department of Systems Engg. and Engg. Management, The Chinese University of Hong Kong, Hong Kong*.
Visiting Faculty under the active guidance of Prof. Duan Li

May, 2013 - June, 2013 **Visiting Faculty**, *Department of Systems Engg. and Engg. Management, The Chinese University of Hong Kong, Hong Kong*.
Visiting Faculty under the active guidance of Prof. Duan Li

May, 2019 - July, 2019 **Visiting Faculty**, *Department of Computer Science, Christian-Albrechts-Universitat zu Kiel, 24118 Kiel, Germany*.
Visiting Faculty

Doctoral and Post-Doctoral Experience

Research Experience as a Research Scholar and Post Doctoral Fellow at IIT Kharagpur

1982—1987 **(Research Scholar)**, *Department of Mathematics, Indian Institute of Technology Kharagpur*, Kharagpur-721302, India.

1987—1988 **Research Associate**, *Department of Mathematics, Indian Institute of Technology Kharagpur*, Kharagpur-721302, India.

Research Interests

1. Operations Research & Decision Models
2. Computational Statistics & Stochastic Programming
3. Fuzzy and Convex Optimization
4. Game Theory and Applications
5. Analytic Hierarchy Process (AHP)
6. Interior Point Methods (IPM)
7. Multi-Objective, Multi-Level & Multi-Choice Programming
8. Planning and Scheduling Uncertain Problems
9. Optimization in Data Science
10. Robust Optimization & Applications
11. Numeric Optimization in Decision Science
12. Mathematics and Statistics for Machine Learning

Honors and Awards

- B G Raghavendra Memorial Award as a best application Paper on Muti-objective Multi-Choice Random Linear Programming Problem jointly with Ph D Scholar Avik Pradhan at 48th Anuual Convention of ORSI (2015), held at ITER Bhubaneswar during December 19-22, 2015.
- Best application Paper on Generic Algorithm jointly with Ph D Scholar D K Mohanty at an International Conference on Soft Computing held at IIT Bhubaneswar during December 22-24, 2017.

Member of Professional Bodies

- Life Member : Indian Society of Theoretical and Applied Mathematics
- Life Member : Operational Research Society of India
- Life Member : International Society on Multi Criteria Decision Making, USA

Member, Editorial Board

- Member of Editorial Board : OPSEARCH, Applied Mathematics and Computation
- Member : OPSEARCH, European Journal of Operational Research

Teaching Experience for B.Tech, M.Tech and M.Sc (Mathematics) Students in last 33 years at Indian Institute of Technology, Kharagpur, India

Mathematics I, II, III, IV
Operations Research
Non-linear Programming
Probability and Statistics
Statistical Inference
Techniques of Analysis and Computer Programming
Introduction to Computing
Engineering Mathematics
Statistical Techniques and CP
Linear Programming and Game Theory
Multi-objective Programming
Statistical Methods
Computer Programming
Engineering Optimization
Programming Languages
Optimization Techniques & Multi-objective Programming

Ph. D Scholars Guided: 14

1. **Dr. Amal Kumar Bit**, Multi-Objective Transportation Problems, 1994.
2. **Dr. Rafikul Islam**, Some Aspects of the Analytic Hierarchy Process, 1995.
3. **Dr. Rakesh Verma**, Multi-Objective Transportation and Trans-shipment Problems, 1998.
4. **Dr. Surabhi Sinha**, Computational Study of Multi-Level Programming Problems, 2000.
5. **Dr. Sankar Kumar Roy**, Multi-Criteria Decision Making Using Game Theoretic Approaches, 2002.
6. **Dr. Rabin Jana**, Genetic Algorithm Based Approaches to Some Uncertain Programming Problems, 2005.
7. **Dr. Rupaj Kumar Nayak**, Some Interior Point Methods, 2007.
8. **Dr. Bidushi Chakraborty**, Generalized Linear Complementamentarity Problems, 2009.
9. **Dr. Srikumar Acharya**, Multi-Choice Programming Problems, 2010.
10. **Dr. Suresh Kumar Barik**, Uncertain Programming Problems and its Applications, 2011.
11. **Dr. Himanshu Kumar Samal**, Stochastic Transportation Problems, 2012.
12. **Dr. Avik Pradhan**, Computational Study of Some Multi-Choice Programming Problems, 2016.
13. **Dr. Dipak Kumar Mohanty**, Computational Study of Some Multi-Objective Programming Problems, 2020.
14. **Mr. Shubham Singh**, Computationally Tractable Formulation of Some Uncertain Optimization Problems,2021.

International and National Journal Publications: 102

1. Shubham Singh and M. P. Biswal(2021)
   "A robust optimization model under uncertain environ- ment: An application in production planning", Computers Industrial Engineering, Vol 155, 107169.
   DOI: https://doi.org/10.1016/j.cie.2021.107169

2. Shubham Singh, A.K. Pradhan and M. P. Biswal(2021)
   " Computation of Some Stochastic Transportation Problems Using Essen Inequality", International Journal of Applied and Computational Mathematics, Vol 07(241), 107169.
   DOI: https://doi.org/10.1007/s40819-021-01131-1

3. D. K. Mohanty, Avik Pradhan and M.P. Biswal(2020):
   Chance Constrained Programming with some Non-normal Continuous random variables, Opsearch(Springer), 2020.

4. D. K. Mohanty, R. K. Jana, and M.P. Biswal(2020):
   Multi-Choice Chance Constrained Programming Problems using Genetic Algorithm, Proceedings of International Conference on Applied and Computational Mathematics, November 23-25, 2018(IIT -Kharagpur), Springer, Mathematical Modeling and Computational Tools, Springer Proceedings in Mathematics Statistics 320,2020.

5. D. K. Mohanty, R. K. Jana and M.P. Biswal(2019):
   Genetic Algorithm for Multi-Choice Integer Linear Programming Problems, Advances in Intelligent Systems and Computing 816(Springer), pp. 809-8191, 2019

6. Avik Pradhan, M.P. Biswal(2019):
   Multi-objective Multi-Choice Random Linear Programming Problem, Operations Research in Development Sector(Special Volume, Springer), pp. 29-51, 2019.

7. Shubham Singh, Avik Pradhan and M.P. Biswal(2019):
   Multi-objective Solid Transportation Problem under Stochastic Environment, Sadhana – Academy Proceedings in Engineering Sciences, 44(5) p.105.
   DOI: https://doi.org/10.1007/s12046-019-1094-0

8. Avik Pradhan and M.P. Biswal(2019):
   Linear Fractional Programming Problems with some Multi-Choice parameters, International Journal of Operational Research(Inder Science), Vol-34, No. 3, pp.321-338, 2019.

9. S. Dutta, M.P. Biswal, S. Acharya, and Rajashree Mishra(2018):
   Fuzzy Stochastic Price Scenario based portfolio selection and its application to BSE using genetic Algorithm, Applied Soft Computing, Vol-62, pp. 867-891, 2018.

10. Avik Pradhan, M.P. Biswal(2018):
    Linear Programming problems with some multi-choice Fuzzy parameters, YJOR, Vol-28, No.2, pp. 249-264, 2018.

11. Rupaj Kumar Nayak, M.P. Biswal(2017):
A low complexity semidefinite relaxation for large-scale MIMO detection, Journal of Combinatorial Optimization, Vol-35, No.2, pp. 473-492, 2017.

12. A. Talla, D.K. Swain, V.K. Tiwari and M.P. Biswal(2017):
Significance of Weather Variable during Critical Growth Stages for Hybrid Rice Production in Subtropical India, Agronomy Journal, Vol-109, No.5, 2017.

13. Avik Pradhan, M.P. Biswal(2019):
Linear Fractional programming problem with some multi-choice parameters, International Journal of Operational Research,Vol-34, No.3, pp.321-338,2019.

14. S. K. Barik , M.P. Biswal(2016):
Possibilistic Linear Programming Problems involving Normal Random Variables, International Journal of Fuzzy System Applications (IJFSA), Vol-5, No.3, 2016.

15. Avik Pradhan, M.P. Biswal(2016):
Multi-choice probabilistic linear programming problem, OPSEARCH,Vol-54, No.1, pp.122-142, 2016.

16. K. K. Patro, M. M. Acharya, M. P. Biswal and S. Acharya(2015):
Computation of a Multi-choice Goal Programming problem, Applied Mathematics and Computation, Vol-271, pp. 489-501, 2015

17. S. Acharya, M. P. Biswal (2015):
Solving multi-choice multi-objective transportation problem, International Journal of Mathematics in Operational Research, Vol-8, No.4, pp. 509-527, 2015

18. S. Acharya, M. P. Biswal (2015):
Application of Multi-Choice Fuzzy Linear Programming Problem to a Garment Manufacture Company , Journal of Information and Optimization Sciences, Vol-36, No.6, pp. 569-593, 2015

19. Avik Pradhan and M.P. Biswal(2015):
Computational Methodology for Linear Fractional Transportation Problem, Proceedings of the 2015 Winter Simulation Conference(IEEE Press), pp.3158-3159, 2015.

20. Avik Pradhan, M.P. Biswal(2015):
Multi-level linear programming problem involving some multi-choice parameters, International Journal of Mathematics in Operational Research, Vol-7, No.3, pp.297-317, 2015.

21. Avik Pradhan, M.P. Biswal(2015):
A Bi-level Multi-choice Programming Problem, International Journal of Mathematics in Operational Research, Vol-7, No.1, pp.1-18, 2015.

22. Avik Pradhan, M.P. Biswal(2014):
Multi-level non-linear programming problem with some multi-choice parameters, Springer Proceedings in Mathematics and Computing, Vol-91, pp.91-101, 2013.

23. R.K. Nayak, M.P. Biswal, S.Padhy (2014):
An Implementable Predictor-Corrector Method for Solving Semidefinite Programming Problems, Journal of Interdisciplinary Mathematics, Vol-17, No. 3, pp.223-242, 2014.

24. Avik Pradhan and M.P. Biswal(2014):
Multi-level Nonlinear Programming Problem with some Multi-Choice Paramers, Mathematics and Computing Springer, pp.91-101,2014.

25. S. K. Barik , M.P. Biswal, and D. Chakraborty(2014):
Two-stage Stochastic Programming Problems involving Multi-choice Parameters, Applied Mathematics and Computation, Vol-240, pp. 109-114(2014).

26. S. Acharya, M. P. Biswal, S.Nanda (2013):
Fuzzy probabilistic Linear programming problems involving Log-normal random variables,The Journal of Fuzzy Mathematics (USA), Vol-21, pp.387-400, 2013

27. D. R. Mohapatra, S. K. Roy and M. P. Biswal (2013):
Multi-Choice stochastic transportation problems involving Extreme value distribution,Applied Mathematical Modeling, Vol-37, pp.2230-2240,2013.

28. R.K. Nayak, M.P. Biswal, S.Padhy (2012):
An Affine Scaling Method for Solving Network Flow Problems, Journal of Discrete Mathematical Sciences and Cryptography (U.K.), Vol-15, pp.23-29, 2012.

29. S. K. Roy, D. R. Mohapatra, and M. P. Biswal (2012):
Multi-Choice stochastic transportation problems with Exponential distribution, Journal of Uncertain Systems, Vol-6, pp.200-213,2012.

30. S. K. Barik , M.P. Biswal, and D. Chakraborty(2012):
Multi-Objective Two-stage stochastic Programming problems involving Interval Discrete Random Variables, Advances in Operations Research, Volume 2012, Article ID 279181, 21 pages.

31. S. K. Barik , M.P. Biswal, and D. Chakraborty(2012):
Two-stage stochastic Programming problems involving Interval Discrete Random Variables, Opsearch, Vol-49, pp.280-298, 2012.

32. S. K. Barik and M.P. Biswal(2012):
Probabilistic Quadratic Programming Problems with some Fuzzy parameters, Advances in Operations Research, 2012.

33. S. K. Barik and M.P. Biswal(2011):
An Interval parameter Two-stage Stochastic Programming Programming Problems involving Exponential Random Variables, International Journal of Operations Research And Optimization, Vol-2(2), pp.199-214, 2011

34. D. R. Mohapatra, S. K. Roy and M. P. Biswal (2011):
Computation of Multi-objective stochastic transportation problems involving normal distribution with joint constraints,The Journal of Fuzzy Mathematics (USA), Vol-19, No.4, pp.865-876, 2011.

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Multi-Objective Fuzzy Probabilistic Programming Problems involving Laplace distribution, The International Journal of Fuzzy Mathematics, Vol. 21 (2013), No.2, 251-266.

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Multi-Objective Two-stage Stochastic Programming Programming Problems involving Normal

distribution, International Journal of Optimization: Theory, Methods and Applications , Vol-2(4), pp.253-272.

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Multi-Objective Stochastic Transportation problem Involving log-normal distribution, Journal of Physical Sciences, Vol-14, pp.63-76 (2010).

38. S. K. Barik, M.P. Biswal, and D. Chakraborty(2011):
Stochastic Programming problems involving Pareto Distribution, Journal of Interdisciplinary Mathematics, Vol-14, pp.39-56.

39. B. Chakraborty, M. P. Biswal, and S. Nanda (2010):
Equivalence of vertical block linear complimentarity problems and multi-objective linear programming problems, Journal of Information and Optimization Sciences (India), Vol-31,pp.245-255,2010.

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Stochastic based on multi-objective transportation problems involving normal randomness, Advanced Modeling and Optimization, Vol-12, pp.205-223 (2010).

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Modification of Karmarkar's projective scaling algorithm, Applied Mathematics and Computation (U.S.A), Vol-216, pp.227-235, 2010.

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Multi-Choice Multi-Objective mathematical programming model for integrated production planning: a case study, International Journal of Systems Science, Vol-44, No.9, pp.1651-1665,2012.

43. S. Acharya and M.P. Biswal(2011):
Linearization Technique for Multi-Choice Quadratic Programming Problem, International Journal of Optimization: Theory, Methods and Applications, Vol-3, pp.45-62, 2011.

44. S. Acharya, and M.P. Biswal(2011):
Solving Probabilistic Programming Problems Involving Multi-Choice Parameters. OPSEARCH, Vol-48, pp.217-235.

45. M.P. Biswal and S. Acharya(2011):
Solving Multi-Choice Linear Programming Problems by Interpolating Polynomials, Mathematical and Computer Modelling ,Vol- 54(2011), 1405-1411.

46. M. P. Biswal, and S. Acharya (2009):
Transformation of a multi-choice linear programming problem, Applied Mathematics and Computation (U.S.A), Vol-210, pp.182-188, 2009.

47. B.N. Sahoo and M.P. Biswal (2009):
An algorithm for solving multi-objective fuzzy linear programming problems, The Journal of Fuzzy Mathematics (U.S.A.), Vol-17, No. 1, pp.9-18..

48. M. P. Biswal, and S. Acharya (2009):
Multi-Choice Multi-Objective Linear Programming Problem , Journal of Interdisciplinary Mathematics(India), 12, (2009), 607-637.

49. N.P. Sahoo and M.P. Biswal (2009):
Computation of multi-objective production planning model with probabilistic constraints, International Journal of Computer Mathematics (U.K.), Vol-86, No.1, pp.185-198, 2009.

50. M. P. Biswal, and S. Acharya (2008):
Some modifications on sequential linear goal programming, Journal of Interdisciplinary Mathematics (India), Vol-11, No.3, pp.414-427, 2008.

51. B. Chakraborty, M. P. Biswal, and S. Nanda (2008):
Solution of Horizontal linear complimentarity problems using multi-objective programming approach and fuzzy approach, The Journal of Fuzzy Mathematics (U.S.A), Vol-16, No.1, pp.199-211, 2008.

52. B. Chakraborty, M. P. Biswal, and S. Nanda (2007):
Solution of parametric vertical block linear complimentarity problems, Internationl Journal of Computer Mathematics (U.K.), Vol-84, No.3, pp. 325-332, 2007.

53. B.B. Tripathy and M. P. Biswal (2007):
A zero-one goal programming approach for project selection, The Journal of Information and Optimization Sciences (India), Vol-28, No.4, pp.619-626, 2007.

54. R. K. Jana and M. P. Biswal (2006):
Genetic based Fuzzy Approach to Multi-objective Chance Constrained with continuous random variables Coefficients, The Journal of Fuzzy Mathematics (USA), Vol-14, No.3, pp.613-628, 2006.

55. R. K. Jana and M.P. Biswal (2006):
Genetic based fuzzy goal programming for multi-objective chance constrained programming problems with continuous random variables, International Journal of Computer Mathematics (U.K.), Vol-83, No.2, pp.171-179,2006.

56. M.P. Biswal and N.P. Sahoo and Duan Li (2005):
Probabilistic linear linearly constrained programming problems with log-normal random variables, OPSEARCH, Vol.42, No.1, pp.70-76, 2005 .

57. N.P. Sahoo and M.P. Biswal (2005):
Computation of Some Stochastic linear programming problems with Cauchy and extreme value distributions, International Journal of Computer Mathematics (U.K.), Vol-82, No.6, pp.685-698 .

58. N.P. Sahoo and M.P. Biswal (2005):
Computation of Some probabilistic linear programming problems involving normal and log-normal random variables with a joint constraints, International Journal of Computer Mathematics (U.K.), Vol-82, No.11, pp.1123-1138, 2005.

59. B. Chakraborty, S. Nanda, and M. P. Biswal (2005):
Equivalence of the generalized vertical block linear complimentarity problems and linear complimentarity problems, Mediterranean Journal Mathematics (Birkhauser), Vol-2, pp. 291-299, 2005.

60. R. K. Jana and M. P. Biswal (2004):
A Stochastic Simulation based Genetic algorithm for Chance Constraint Programming Problems, with continuous random variables. International Journal of Computer Mathematics (UK), Vol81(9),1069-1076.

61. R. K. Jana and M. P. Biswal (2004):
A Stochastic Simulation based Genetic algorithm for Chance Constraint Programming Problems, with some discrete random variables. International Journal of Computer Mathematics (UK), Vol-81(12), 1455-1463.

62. B. Chakraborty, S. Nanda, and M. P. Biswal (2004):
On the Solution of Parametric Linear Complementarity Problems, International Journal of Pure and Applied Mathematics, Vol-17, No.1, pp.9-18, 2004.

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Convexification, Concavification and Global Optimization, Annals of Operations Research (SpringerU.S.A), Vol-105, 213-226, 2001.

64. S. Hulsurkar, M.P. Biswal and S.B. Sinha (2000):
Fuzzy programming approach to Multi-objective probabilistic linear programming Problems when the constraints follow joint normal distribution, Fuzzy Sets and Systems (North-Holland), Vol-109, No.1, 91-96.

65. S. Sinha and M.P. Biswal(2000):
Integer Solutions via Goal Programming to Hierarchial Systems, OPSEARCH, Vol-37, No. 3, 204-220.

66. S. Sinha and M.P. Biswal(2000):
Fuzzy programming approach to Bi-level programming problems, The Journal of Fuzzy Mathematics (U.S.A), Vol-8, 337-347.

67. S.K. Roy, M.P. Biswal and R. N. Tiwari(2000):
An approach to solve multi-objective Bimatrix Games for Nash Equlibrium, Ricerca Operativa (Italy), Vol-30, 47-64, 2000.

68. R. Islam, M.P. Biswal and S.S. Alam(2000):
Analysis of inconsistent interval judgement matrices, Ricerca Operativa (Italy), Vol-29, n.90,39-53 (2000).

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Cooperative Fuzzy Game Theoretic Approach to solve some multi-objective linear programming problem, The Journal of Fuzzy Mathematics(U.S.A), Vol-8, 635-643.

70. M.P. Biswal and R. Verma(1999):
Fuzzy Programming Technique to solve a non-linear multi-objective Transportation problem, The Journal of Fuzzy Mathematics (U.S.A), Vol-7, No.3, 723-730, 1999.

71. M.P. Biswal and N.P. Biswal and Duan Li (1998):
Probabilistic linear programming problems with exponential random variables: A technical note, European Journal of Operational Research (North-Holland) , Vol-111, pp.589-597.

72. Duan Li and M.P. Biswal (1998):
Exponential transformation in convexifying noninferior frontier and exponential generating method, Journal of Optimization Theory and Application (Springer-U.S.A., Vol-99, No. 1, October, 1998.

73. S.B. Sinha, M.P. Biswal and S.Hulsurkar (1998):
Fuzzy programming approach to Multi-objective probabilistic linear programming Problems when only bi 's are probabilistic, The Journal of Fuzzy Mathematics (U.S.A), Vol-5, No. 1, 63-73.

74. M.P Biswal(1997):
Use of Projective and Scaling algorithm to solve multi-objective fuzzy linear programming problems, The Journal of Fuzzy Mathematics (U.S.A), Vol-5, No.2, 439-448.

75. R. Islam, M.P. Biswal, and S.S. Alam(1997):
Preference programming and inconsistent interval judgement, European Journal of Operational Research (North-Holland), Vol-97, 53-62.

76. R. Islam, M.P. Biswal and S.S. Alam(1997):
Deriving weights from comparison matrices by Goal Programming, Ricerca Operativa (Italy), Vol-26, n.79, 3-17.

77. R.Islam, M.P. Biswal and S.S. Alam(1997):
Clusterisation of alternatives in the Analytic Hierarchy Process, Military Operations Research(U.S.A), Vol-3, 69-78.

78. R.Verma, M.P. Biswal and A.Biswas (1997):
Fuzzy programming technique to solve multi-objective transportation problems with some nonlinear membership functions, Fuzzy Sets and Systems (North-Holland), Vol-91, 34-43.

79. R.Verma, M.P. Biswal and A.Biswas(1997):
Fuzzy Programming Approach To Trans-shipment Problem, The Journal of Fuzzy Mathematics(U.S.A), Vol-5, No.1, 1997.

80. R. Verma, M.P. Biswal and A. Biswas(1997):
Fuzzy Analytic Hierarchy Process to solve a multi-objective Transportation problems, The Journal of Fuzzy Mathematics (U.S.A), Vol-5, No. 3, 593-604.

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Fuzzy programming approach to Multi-objective stair-case transportation Problems, The Journal of Fuzzy Mathematics (U.S.A), Vol-5, No. 4, 865-873.

82. S.Hulsurkar, M.P. Biswal and S.B.Sinha(1997):
Fuzzy programming approach to Multi-objective Stochastic linear programming Problems , Fuzzy Sets and Systems (North-Holland), Vol-88, 173-181.

83. M.P. Biswal and S.B.Sinha(1996):
Fuzzy programming approach to some multi-objective nonlinear programming problems, Journal of Fuzzy Mathematics (U.S.A), Vol-4, 315-321.

84. R.Verma, M.P. Biswal and A.Biswas(1996):
Fuzzy programming approach to Probabilistic Multi-objective Transportation Problems with Pareto Optimum Solution, Journal of Fuzzy Mathematics (U.S.A), Vol-4, 301-314.

85. Islam, R., Biswal, M.P. and Alam, S.S.(1995):
Determination of weights from pairwise comparison matrices in analytic hierarchy process: A fuzzy programming approach, Journal of Fuzzy Mathematics (U.S.A), Vol-3, 507-516.

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Determination of local and global weights of alternatives from inconsistent interval judgement matrices, Ricerca Operativa (Italy), Vol-24, No. 72, 39-56.

87. Bit, A.K, Biswal, M.P. and Alam, S.S.(1994):
Fuzzy programming approach to chance constrained multi- objective transportation problem, Journal of Fuzzy Mathematics (U.S.A) 2, 117-130.

88. Bit, A.K., Biswal, M.P., and Alam, S.S.(1994):
Fuzzy programming approach to multi-objective assignment problem, Journal of Fuzzy Mathematics (U.S.A) 2, 905-909

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A new weight determination technique in fuzzy Analytic Hierarchy Process, Journal of the Assam Science Society(India) 36, 165-176.

90. Islam, R., Biswal, M.P. and Alam, S.S.(1994):
The effect of splitting objectives in the Analytic Hierarchy Process, Ricerca Operativa(Italy) 24, No. 70, 5-25.

91. Bit, A.K., Biswal, M.P., and Alam, S.S.(1993):
Optimal planning for allocation of coal energy by Goal programming, Industrial Engineering Journal 22, 8-12.

92. Bit, A.K., Biswal, M.P., and Alam, S.S.(1993):
Fuzzy programming technique for variants of multi-objective Transportation problem, Industrial Engineering Journal 22, 24-27.

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Fuzzy programming technique for multi-objective capacited Transportation problem, Journal of Fuzzy Mathematics (U.S.A) 1, 367-376.

94. Bit, A.K., Biswal, M.P., and Alam, S.S.(1993):
An interactive fuzzy programming algorithm for multi-objective Transportation problems, Journal of Fuzzy Mathematics(U.S.A) 1, 835-842.

95. Bit, A.K, Biswal, M.P. and Alam, S.S.(1993):
Unbalanced transportation problems with multiple fuzzy goals, Ricerca Operativa (Italy) 23, 29-41.

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Fuzzy programming approach to multi-objective solid transportation problems, Fuzzy sets and Systems (North-Holland), Vol-57, 183-194.

97. Bit, A.K., Biswal, M.P. and Alam, S.S.(1993):
An additive model for multi-objective transportation problems, Fuzzy Sets And Systems (North-Holland), vol-57, 313-319.

98. Bit, A.K., Biswal, M.P. and Alam, S.S.(1992):
Fuzzy programming approach to multi-criteria decision making trans- portation problems, Fuzzy Sets and Systems (North-Holland), Vol-50, 135-141.

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A modified fuzzy programming approach to vector maximum and minimum problem, Ricerca Operativa (Italy) 22, 69-80.

100. Biswal, M.P.(1992):
Fuzzy programming technique to solve multi-objective geometric programming problems, Fuzzy Sets and Systems (North-Holland) 51, 67-71.

101. Sinha, S.B., Biswas, A. and Biswal, M.P.(1989):
Linear programming approach to solve geometric programming problems, Journal of information and Optimization Sciences 10, 165-176.

102. Sinha, S.B., Biswas, A. and Biswal, M.P.(1987):
Geometric programming problems with negative degrees of difficulty, European Journal of Operational Research (North-Holland) 28, 101-103.

List of Reference

(I): Professor Ram Narayan Mohapatra
Department of Mathematics
University of Central Florida, Florida-32816
E-mail: ram.mohapatra@ucf.edu

(II):Professor Biswa Nath Datta, IEEE Fellow
Distinguished Research Professor
Northern Illnois University
Illnois-60115, USA
E-mail: profbiswa@yahoo.com
.

(III): Professor Ranjan Kumar Mohanty
Department of Mathematics
South Asian University, New Delhi-110021
E-mail: rmohanty@sau.ac.in
.

(IV):Professor Sudarsan Padhy
Former Director
Institute of Mathematics and Applications, Bhubaneswar
E-mail: sudarsan@silicon.ac.in .