

Curriculum Vitae and Publications

Professor, Dr. Dr. Andranik MELIK-TANGYAN (TANGIAN)
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Civil status Born on March 29, 1952, in Moscow, Russian and German citizen of Armenian origin, married, three grown up children

Current occupation

- Head of unit ('Referat') *Policy Modeling* at the Institute for Economic and Social Research (WSI), Hans-Böckler-Foundation, Düsseldorf
- Professor at the Karlsruhe Institute of Technology (formerly University of Karlsruhe)

Education and Qualifications

Mathematician (Moscow State University, 1974)

Ph.D. in system analysis (Moscow, Academy of Sciences of the USSR, 1979)

Doctor of Sciences (= habilitation) in mathematical cybernetics (Moscow, Academy of Sciences of the USSR, 1989)

Three certificates of qualification as university professor (*Attestation*, Paris, Ministry of National Education and Culture, 1992) in

- Applied mathematics and applications of mathematics
- General economics
- Political science

'Umhabilitation' (re-habilitation) in mathematical economics, University of Hagen, Germany, 1998

'Umhabilitation' in general economics, Karlsruhe Institute of Technology, Germany 2008

Professor, Karlsruhe Institute of Technology, 2009

Working languages Russian (mother tongue), English, French, German

Professional experience

1974–1976 engineer at the Moscow State University of Oil and Gas

1976–1980 postgraduate student and researcher at the Academy of Sciences of the USSR, Moscow

1980–1983 assistant professor at the Academy of National Economy of the Council of Ministers of the USSR, Moscow

1983–1990 senior researcher at the Academy of Sciences of the USSR, Moscow

1990–1991 Visiting professor at the University of Hagen, Germany

1991–1993 Visiting professor at the ENSIMAG (Ecole Nationale Supérieure d'Informatique et de Mathématiques Appliquées de Grenoble), "High-level grant" holder from the French Ministry of Research and Technology at LIFIA (Laboratoire d'Informatique Fondamentale et d'Intelligence Artificielle), Institut National Polytechnique de Grenoble, and research/teaching position at the University of Paris I (Sorbonne)

1993–2002 Researcher and since 1998, as Privatdozent, senior assistant professor (Oberassistent, state position C2) at the University of Hagen, Germany

2003–present Head of unit ('Referat') *Policy Modeling* at the Institute for Economic and Social Research (WSI), Hans-Böckler-Foundation, Düsseldorf, Germany

2003–present Lecturer, then Privatdozent, and since 2009 professor at the Karlsruhe Institute of Technology, Germany, teaching the courses *Mathematical theory of democracy* and *Decision making in politics and economics with applications to the European employment strategy*

Principal scientific developments

MATHEMATICAL THEORY OF DEMOCRACY

Applications: elections, evaluation of representatives and representative bodies (president, government, parliament), Gallup polls of public opinion, multicriteria decision making (stock exchange predictions, traffic control)

METHODS FOR CONSTRUCTING UTILITY FUNCTIONS AND COMPOSITE INDICATORS FOR SOCIO-ECONOMIC RESEARCH

Applications: policy monitoring, targeting, optimization, in particular of the EU labor market policies (flexicurity, quality of work, German regional labor market policy, social security)

ARTIFICIAL PERCEPTION

Applications: artificial intelligence, pattern recognition, computer vision, signal understanding, cognitive modeling, automatic notation of music

MODELS AND VISUAL REPRESENTATION OF MUSICAL AND THEATRICAL INTERPRETATION

Applications: expert systems on performance, music software, education of musicians and actors

University courses

MATHEMATICAL THEORY OF DEMOCRACY

Karlsruhe Institute of Technology (formerly University of Karlsruhe) 2009–present

DECISION MAKING IN POLITICS AND ECONOMICS BASED ON QUANTITATIVE ANALYSIS

- (a) Academy of National Economy of the Council of Ministers of the USSR 1980–1983
- (b) University of Hagen 1995–2002
- (c) Karlsruhe Institute of Technology (formerly University of Karlsruhe) 2003–present

ECONOMETRICS I AND ECONOMETRICS II

University of Hagen 1995–2002

PROBABILITIES AND STATISTICS

- (a) Academy of National Economy of the Council of Ministers of the USSR Moscow 1980–1983
- (b) University of Paris I (Sorbonne), 1993
- (c) University of Hagen 1995–2002

ARTIFICIAL INTELLIGENCE AND ARTIFICIAL PERCEPTION

Institute National Polytechnique de Grenoble 1992

CALCULUS University of Paris I (Sorbonne), 1993

Work as expert and project coordinator/contributor

2002–2003 Survey report on the mathematical theory of democracy for UNESCO, Paris

2005 Expert of the Indicators group of the Employment committee, DG Employment, Social Affairs, and Equal Opportunities, European Commission, Brussels

2005 Expert of the Belgian scientific commission for evaluating research projects “Science and Future: Labor market, quality of work and employment”, Brussels

2006 Expert of the German–Portugal–Slovenian governmental commission “Flexicurity strategies and their implications at the European level” for the German–Portugal–Slovenia presidency in the EU, Lisbon

2007–2008 Member of the scientific board of the EU study *The impact of new forms of labor on industrial relations and the evolution of labor law in the European Union* with experts from 27 Member States (for the European Parliament)

2008 Expert of the Belgian scientific commission for evaluating research projects “Science and Future: Labor market, quality of work and employment”, Brussels

2009 Member of the scientific board of the European Parliament project *Indicators of Job quality in the European Union*, Brussels

2009 Expert of the Estonian scientific commission for evaluating projects on labor market studies, Tallin

2009–2010 Coordinator of the European project *National Implementation of flexicurity pathways in consensus with social partners and backed up by monitoring instruments and empirical feedback* for the European Commission

- 2010 Expert of the Pan-European Trade Union Council on flexicurity, empirical analysis and reforms, Brussels–Sarajevo
- 2010 Expert of the European Federation of Food, Agriculture and Tourism Trade Union on flexicurity proposals, Brussels–Luxembourg
- 2010 Expert of the European Training Foundation for the project *Labor market flexicurity and the role of lifelong learning in transition and developing countries*, Turin

Membership in editorial boards: *American Journal of Operations Research* and *American Journal of Industrial and Business Management*

Reviews for journals: *Social Choice and Welfare*, *Public Choice*, *International Journal of Employment Relations*, *Journal of European Social Policy*, *International Journal of Manpower*, *European Journal of Operational Research*, *Journal of Classification*, *Zeitschrift für Betriebswirtschaft*, *Leonardo*

Committees

- 2011–present Council for European Studies (Columbia University)
- 2008–present International Sociological Association, Working group *Social Indicators* (RC55)
- 2005–present Member of the Executive Committee of the International Association of Employment Relations
- (Co-)chairmanship at four international conferences and symposia:
- 1995 and 2000 *The 3rd and 4th International Conference on Econometric Decision Models*, Hagen, Germany (together with Josef Gruber)
 - 1995 *Cybernetic paradigms of musical and theatrical performance*, Baden-Baden, 1995 (together with George Lasker)
 - 1996 *Computational methods in utility theory and social choice*, Maastricht

Other activities Composer of music for two theatrical plays and four films. Member of the German Composers' Union

Selected publications Author and/or editor of 8 books

- ALEKSEEV Y., ANDREEVA E., BORODA M., AND TANGIAN A. (EDS.) (1988) *Quantitative Methods in Ethnomusicology and Music Theory*. Moskau: Soviet Composer, 284 pp. (Russian)
- TANGIAN (TANGUIANE) A. (1991) *Aggregation and Representation of Preferences: Introduction to Mathematical Theory of Democracy*. Berlin: Springer-Verlag, IX, 331 pp.
- TANGIAN (TANGUIANE) A. (1993) *Artificial Perception and Music Recognition*. Berlin: Springer-Verlag, XV, 210 pp.
- LASKER G. AND TANGIAN A. (EDS.) (1996) *Proceedings of the 1995 Symposium on Cybernetic Paradigms of Musical and Theatrical Performance, August 16–20, 1995, Baden-Baden*. Windsor, Ontario: International Institute for Advanced Studies in Systems Research and Cybernetics, 60 pp.
- TANGIAN A. AND J. GRUBER (EDS.) (1997) *Constructing Scalar-Valued Objective Functions*. Berlin: Springer-Verlag, VIII, 298 pp.
- TANGIAN A. AND J. GRUBER (EDS.) (2002) *Constructing and Applying Objective Functions*. Berlin: Springer-Verlag, XII, 585 pp.
- TANGIAN A. (2011) *Flexicurity and Political Philosophy*. New York: Nova, 208 pp.
- TANGIAN A. (2014) *Mathematical Theory of Democracy*. Berlin–Heidelberg, Springer, xx, 615 pp.
- and over **250 articles** in mathematical social sciences, economics, statistics, cognitive science, and mathematical music theory, among others
- TANGUIANE A. (1993) Inefficiency of democratic decision making in an unstable society. *Social Choice and Welfare*, 10 (3), 249–300
- TANGUIANE A. (1994) Arrow's paradox and mathematical theory of democracy. *Social Choice and Welfare*, 11 (1), 1–82
- TANGUIANE A. (1994) A principle of correlativity of perception and its applications to music recognition. *Music Perception*, 11 (4), 465–502
- TANGUIANE A. (1995) Towards axiomatization of music perception. *Journal of New Music Research*, 24 (3), 247–281
- TANGIAN A. (1997) Election of vice-president and adding new members to representative bodies. *Social Choice and Welfare*, 14 (1), 23–45
- TANGIAN A. (1997) An outline of the mathematical theory of democracy and its applications. *Group Decision and Negotiation*, 6(3), 205–230

- TANGIAN A.S. (1997) Performance interpretation by segmentation and its notation. *Contemporary Theatre Review*, 6(4), 81–93
- TANGIAN A. (1999) Towards a generative theory of interpretation for performance modeling. *Musicae Scientiae*, 3(2), 237–267
- TANGIAN A. (2000) Unlikelihood of Condorcet’s paradox in a large society. *Social Choice and Welfare*, 17 (2), 337–365
- TANGIAN A. (2001) Constructing a monotonic quadratic objective functions in n variables from a few 2-dimensi-onal indifferences. *European Journal of Operational Research*, 130 (2), 276–304
- TANGIAN A. (2001) How do we think: Modeling interactions of memory and thinking. *Cognitive Processing*, 2, 117–151
- TANGIAN A. (2002) Constructing a quasi-concave quadratic objective function from interviewing a decision maker. *European Journal of Operational Research*, 141, 608–640
- TANGIAN A. (2002) Interview design for revealing preferences of policy makers. *Review of Economic Design*, 7, 349–382
- TANGIAN A. (2003) Constructing Rhythmic Canons. *Perspectives of New Music*, 41 (2), 66-94
- TANGIAN A. (2004) Redistribution of university budgets with respect to the status quo. *European Journal of Operational Research*, 157 (2), 409–428
- TANGIAN A. (2004) A model for ordinally constructing additive objective functions. *European Journal of Operational Research*, 159, 476–512
- TANGIAN A. (2007) Analysis of the third European survey on working conditions with composite indicators. *European Journal of Operational Research*, 181, 468–499
- TANGIAN A. (2007) Selecting predictors for traffic control by methods of the mathematical theory of democracy. *European Journal of Operational Research*, 181, 986–1003
- TANGIAN A. (2007) Flexicurity, Flexinsurance, and the European Commission’s “Green paper: Modernizing labor law to meet the challenges of the 21st century”. *International Employment Relations Review*, 13 (1), 1–14
- TANGIAN A. (2007) European flexicurity: concepts, methodology and policies. *Transfer*, 13(4), 551–573.
- TANGIAN A. (2008) Predicting DAX trends from Dow Jones data by methods of the mathematical theory of democracy. *European Journal of Operational Research*, 185, 1632–1662
- TANGIAN A.S. (2008) Is Europe ready for flexicurity? Empirical evidence, critical remarks, and a reform proposal. *Intereconomics*, 43 (2), 99–111
- TANGIAN A. (2008) A mathematical model of Athenian democracy. *Social Choice and Welfare*, 31, 537–572
- TANGIAN A. (2008) Towards consistent principles of flexicurity. *International Employment Relations Review*, 14 (1), 14–38
- TANGIAN A. (2008) Multi-criteria optimization of regional employment policy: A simulation analysis for Germany. *Review of Urban and Regional Development*, 20 (2), 103–122
- SEIFERT H. AND A. TANGIAN (2008) Flexicurity: Quel équilibre entre flexibilization du marché du travail et sécurisation sociale? *La Revue de l’IRES*, 56, 2008/1, 41–59
- SEIFERT H. AND A. TANGIAN (2008) Flexicurity — gibt es ein Gleichgewicht zwischen Flexibilität des Arbeitsmarktes und sozialer Sicherheit? *WSI-Mitteilungen*, 61 (11), 627–635
- TANGIAN A. (2009) Decent work: indexing European working conditions and imposing workplace tax. *Transfer* 2009/3-4, 527–556
- SEIFERT H. AND TANGIAN A. (2009) Index “Qualität der Arbeit”: Nordische Länder und Deutschland im Vergleich. *WSI-Mitteilungen*, 62 (1), 52–57
- TANGIAN A. (2010) Evaluation of German parties and coalitions by methods of the mathematical theory of democracy. *European Journal of Operational Research*, 202, 294–307
- TANGIAN A. (2010) Application of the mathematical theory of democracy to Arrow’s Impossibility Theorem (How dictatorial ar Arrow’s dictators?) *Social Choice and Welfare*, 35(1), 135–167
- TANGIAN A. (2013) German parliamentary elections 2009 from the viewpoint of direct democracy. *Social Choice and Welfare*, *Social Choice and Welfare*, 40(3), 833–869
- TANGIAN A. (2014) Redefinition of the notion ‘democracy’ in 19–20th centuries and political manipulations with it after the World War II. *Questions of Jurisprudence*, 3(25)/2014, 58-140 (Russian)
- TANGIAN A. (2017) Policy representation of a parliament: the case of the German Bundestag 2013 election. *Group Decision and Negotiation*, 26(1), 151–179

- TANGIAN A. (2017) An election method to improve policy representation of a parliament. *Group Decision and Negotiation*, 26(1), 181–196
- TANGIAN A. (2018) The Third Vote experiment: Enhancing policy representation of a student parliament. *Group Decision and Negotiation*. (Forthcoming, available online 31 July 2017)

Most recent working papers

- TANGIAN A. (2015) *Decision making in politics and economics: 6. Empirically constructing the German political spectrum*, Working Paper 66, Karlsruhe Institute of Technology, Karlsruhe
- TANGIAN A. (2015) *Is the Left-Right Alignment of Parties Outdated?* WSI Diskussionspapier 198, Hans-Böckler-Stiftung, Düsseldorf
- TANGIAN A. (2016) *Devaluation of One's Labor in Labor-Commodities-Money-Commodities-Labor Exchange as a Cause of Inequality Growth*. Working Paper 86, Karlsruhe Institute of Technology, Karlsruhe
- TANGIAN A. (2016) *The Third Vote Experiment: VAA-Based Election to Enhance Policy Representation of the KIT Student Parliament*. Working Paper 93, Karlsruhe Institute of Technology, Karlsruhe
- TANGIAN A. (2017) *Selection of Questions for VAAs and VAA-based Election Method*. Working Paper 100, Karlsruhe Institute of Technology, Karlsruhe
- TANGIAN A. (2017) *Decreasing Labors-Labor Exchange Rates as a Cause of Inequality Growth*. Working Paper 104, Karlsruhe Institute of Technology, Karlsruhe
- TANGIAN A. (2017) *Design and results of the third vote experiment during the 2017 election of the Karlsruhe Institute of Technology student parliament*. Working Paper 106, Karlsruhe Institute of Technology, Karlsruhe
- TANGIAN A. (2017) *Policy representation by German parties at the 2017 federal election*. Working Paper 107, Karlsruhe Institute of Technology, Karlsruhe
- TANGIAN A. (2017) *Policy representation by the 2017 Bundestag*. Working Paper 108, Karlsruhe Institute of Technology, Karlsruhe

Complete list of publications by Andranik Tangian

1 Publications in economics and politics

1. TANGIAN A. S. (1979) A Model for Revealing Consumer Preference. *Ekonomika i matematicheskie metody*, 15 (1), 128–134. (Russian).
2. TANGIAN A. S. (1979) *Aggregation in a Model of Social Choice*. Preprint. Moscow: Central Economical-Mathematical Institute of the USSR Academy of Sciences, 64 pp. (Russian).
3. TANGIAN A. S. (1979) *A Coalition Model of Social Choice*. Ph.D. Thesis in System Analysis. Moscow: the Central Mathematical-Economical Institute of the USSR Academy of Sciences, 111 pp. (Russian).
4. TANGIAN A. S. (1979) *A Hierarchical Model of Social Choice*. Moscow: the All-Union Institute of Scientific and Technical Information, DEP No. 2389–79, 27 pp. (Russian).
5. TANGIAN A. S. (1979) *Models of Social Choice with Finite and Infinite Number of Participants*. Preprint. Moscow: the Central Mathematical-Economical Institute of the USSR Academy of Sciences, 53 pp. (Russian).
6. TANGIAN A. S. (1980) A Hierarchical Model of Group Choice. *Ekonomika i matematicheskie metody*, 16 (3), 519–534. (Russian).
7. TANGIAN A. S. (1980) *Practical Construction of an Additive Goal Function*. Preprint. Moscow: the Central Mathematical-Economical Institute of the USSR Academy of Sciences, 52 pp. (Russian).
8. TANGIAN A. S. (1981) Constructing Approximations of a Separable Goal Function. In: *Problems and Methods of Decision Making in Organizing Control Systems*. Moscow–Zvenigorod: the All-Union Scientific Research Institute of System Research, 96–97. (Russian).
9. TANGIAN A. S. (1981) On Arrow’s Theorem for Coalition Algebras. *Ekonomika i matematicheskie metody*, 17 (4), 800–801. (Russian).
10. TANGIAN A. S. (1981) On Construction of an Additive Goal Function. *Doklady Akademii Nauk SSSR*, 260 (3), 539–543. (Russian). English translation: *Soviet Mathematics (Doklady)*, 1981, 24 (2), 307–311.
11. TANGIAN A. S. (1981) Multiobjective Choice Problem in Developing a Complex Plan. In: *Actual Problems of Perfecting Economic Mechanism at the Contemporary Stage of Development of Socialist Economy. Summaries of All-Union Scientific and Practical Conference. Section of Perfecting the Level of Management of Socialist Industry*. Moscow: the Academy of National Economy of the USSR Council of Ministers, 67–69. (Russian).
12. TANGIAN A. S. (1981) Reconstructing Separable Goal Function. In: *The First All-Union Conference on Statistical and Discrete Analysis of Non-Numerical Information, Expert Judgements, and Discrete Optimization. Summaries*. Moscow–Alma-Ata, 159–160. (Russian).
13. TANGIAN A. S. (1981) Stability of Social Choice Model. In: Yefimov B.A. (Ed.) *Some Aspects of Modeling Social Utility*. Moscow: the Central Mathematical-Economical Institute of the USSR Academy of Sciences, 45–59. (Russian).
14. TANGIAN A. S. (1981) Transition to an Infinite Number of Participants in a Model of Group Choice. *Ekonomika i matematicheskie metody*, 17 (1), 109–120. (Russian).
15. TANGIAN A. S. (1982) Constructing a Separable Goal Function. *Ekonomika i matematicheskie metody*, 18 (5), 890–899. (Russian).
16. TANGIAN A. S. (1982) Estimating Inaccuracy for the Approximation of an Additive Goal Function. In: *Analysis of Non-Numerical Data in System Research. Proceedings of the All-Union Scientific Research Institute of System Research*. Moscow, 1982, No. 10, 124–131. (Russian).
17. ZELENOV V. A., UGINSKII I. K., AND TANGIAN A.S. (1982) *Forming a Purpose-Oriented Complex Program for Production of Consumer Goods in an Industry Subbranch*. Moscow: the Academy of National Economy of the USSR Council of Ministers, 56 pp. (Russian).
18. TANGIAN A. S. (1982) Successive Aggregation in a Group Choice Model. *Ekonomika i matematicheskie metody*, 18 (1), 105–114. (Russian).
19. TANGIAN A. S. (1983) Constructing Additive Utility Function. In: Golshtein E.G. (Ed.) *Mathematical Apparatus of Economic Modeling*. Moscow: Nauka, 190–201. (Russian).

20. TANGIAN A. S. (1984) Statistical Estimation of the Intensity of Preferences. In: *The All-Union Conference "Non-Numerical Statistics, Expert Judgements, and Related Topics". The Second All-Union Conference on Statistical and Discrete Analysis of Non-Numerical Information and Expert Judgements. Summaries.* Moscow–Tallinn, 112–113. (Russian).
21. TANGIAN A. S. (1985) Estimating Preference Intensity with the Help of Borda–Laplace Probability Model. *Ekonomika i matematicheskie metody*, 21 (1), 110–116. (Russian).
22. TANGIAN A. S. (1988) *Aggregation of Preferences*. Doctoral Dissertation in Mathematical Cybernetics. Moscow: the Computer Center of the USSR Academy of Sciences, 302 pp. (Russian).
23. TANGIAN A. S. (1988) Representation of a Weak Ordering by a Numerical Function. *Doklady Akademii Nauk SSSR*, 298 (5), 1076–1080. (Russian). English translation: *Soviet Mathematics (Doklady)*, 37 (1), 222–225.
24. TANGIAN A. S. (1989) Interpretation of Dictator in Arrow’s Model as a Representative of the Collective. 1. The Existence of Dictator-Representatives. *Matematicheskoe modelirovanie*, 1 (7), 51–67. (Russian).
25. TANGIAN A. S. (1989) Interpretation of Dictator in Arrow’s Model as a Representative of the Collective. 2. The Estimation of Representativeness of the Dictator for Independent Participants. *Matematicheskoe modelirovanie*, 1 (7), 68–92. (Russian).
26. TANGIAN A. S. (1989) A Model of Collective Representation Under Democracy. *Matematicheskoe modelirovanie*, 1 (10), 80–125. (Russian).
27. TANGIAN A. S. (1989) *Optimal Choice in Arrow’s Model with Measures on the Sets of Coalitions and Prognoses*. Preprint. Moscow: the Computer Center of the USSR Academy of Sciences, 63 pp. (Russian).
28. TANGIAN A. S. (1989) Optimal Dictatorial and Multidictatorial Choice in Arrow’s Model. Paper presented at *the Second International Conference on Econometric Decision Models, University of Hagen, held in Haus Nordhelle, August 29–September 1, 1989*, 12 pp.
29. TANGIAN A. S. (1990) A Mathematical Model of Collective Representation. *Doklady Akademii Nauk SSSR*, 313 (5), 1057–1062. (Russian).
30. TANGIAN A. S. (1990) A Model of Collective Representation of a Council Type. *Matematicheskoe modelirovanie*, 1990, 2 (5), 60–103. (Russian).
31. TANGIAN A. S. (1990) A Model of a Council as a Collective Representative. *Doklady Akademii Nauk SSSR*, 315 (4), 803–808. (Russian).
32. TANGIAN A. S. (1990) A Model of Council-Like Collective Representation. Paper presented at *the 6th World Congress of the Econometric Society, 22–28 August, Barcelona, Spain*. 11 pp.
33. TANGIAN A. S. (1990) A New Look at Arrow’s Paradox. In: *Thesisy dokladov III Vsesoyusnoy skoly-seminara "Kombinatorno-statisticheskie metody analiza i obrabotki informatszii, ekspertnoe otsenivanie"*, 10–15 September 1990, Odessa, Odessa Polytechnical Institut, 1990, p. 88. (Russian).
34. TANGIAN A. S. (1990) Optimal Appointment of Dictator in Arrow’s Model. *Doklady Akademii Nauk SSSR*, 310 (6), 1310–1314. (Russian).
35. TANGIAN A. S. (1991) *Aggregation and Representation of Preferences. Introduction to Mathematical Theory of Democracy*. Berlin: Springer-Verlag, IX, 331 pp.
36. TANGIAN A. S. (1991) *Optimal Appointment of Vice-President and Recurrent Construction of Cabinets and Councils*. Hagen: FernUniversität, Discussion Paper No. 161, 27 pp.
37. TANGIAN A. S. (1991) Optimal Dictatorial and Multidictatorial Choice in Arrow’s Model with Applications to Multicriteria Decision Making. In: Gruber J. (Ed.) *Econometric Decision Models: New Methods of Modeling and Applications. Proceedings of the Second International Conference on Econometric Decision Models, University of Hagen, held in Haus Nordhelle, August 29–September 1, 1989*. Lecture Notes in Economics and Mathematical Systems, Vol. 366. Berlin: Springer-Verlag, 248–266.
38. TANGIAN A. S. (1991) *Overcoming Arrow’s Paradox and Development of the Mathematical Theory of Democracy*. Hagen: FernUniversität, Discussion Paper No. 160, 67 pp.
39. TANGIAN A. S., AND J. GRUBER (1991) *On Constructing Objective Functions*. Hagen: FernUniversität, Discussion Paper No. 168, 26 pp.

40. TANGUIANE A. S., AND J. GRUBER (1991) On Constructing Objective Functions. In: Gruber J. (Ed.) *Econometric Decision Models: New Methods of Modeling and Applications. Proceedings of the Second International Conference on Econometric Decision Models, University of Hagen, held in Haus Nordhelle, August 29–September 1, 1989.* Lecture Notes in Economics and Mathematical Systems, Vol. 366. Berlin: Springer-Verlag, 222–247.
41. TANGUIANE A. S. (1992) *Inefficiency of Democratic Decision Making in an Unstable Society.* Hagen: FernUniversität, Discussion Paper No. 185, 51 pp.
42. TANGUIANE A. S. (1992) *On Constructing Quadratic Objective Functions.* Hagen: FernUniversität, Discussion Paper No. 192, 27 pp.
43. TANGUIANE A. S. (1993) *Constructing Quadratic and Separable Objective Functions.* Hagen: FernUniversität, Discussion Paper No. 205, 44 pp.
44. TANGUIANE A. S. AND GRUBER J. (1993) *Towards a Quadratic Objective Function for Economic Policy in Germany.* Hagen: FernUniversität, Discussion Paper No. 204, 32 pp.
45. TANGUIANE A. S. (1993) Inefficiency of Democratic Decision Making in an Unstable Society. *Social Choice and Welfare*, 10 (3), 249–300.
46. TANGUIANE A. S. (1994) Arrow’s Paradox and Mathematical Theory of Democracy. *Social Choice and Welfare*, 11 (1), 1–82.
47. GRUBER J. AND A.S. TANGUIANE (1994) *An Ordinal Regression Model for Constructing Quadratic Objective Functions.* Hagen: FernUniversität, Discussion Paper No. 212, 43 pp.
48. TANGUIANE A. S. (1994) An Outline of the Mathematical Theory of Democracy. In: G.Lasker (Ed.) *Advances in Sociocybernetics, Vol. 1.* Windsor (Canada) The International Institute for Advanced Studies in Systems Research, Informatics, and Cybernetics, 38–46.
49. TANGUIANE A. S. (1995) Inefficiency of Democracy in an Unstable Society. In: G.Lasker (Ed.) *Research in Progress, Vol. II.* Windsor (Canada) The International Institute for Advanced Studies in Systems Research, Informatics, and Cybernetics, 130–136.
50. TANGUIANE A. S. (1995) Review of P.J.Coughlin’s *Probabilistic voting theory*, New York: Cambridge University Press, 1993. *Journal of Classification*, 12, 145–146.
51. TANGUIANE A.S. AND J. GRUBER (1995) *Constructing Quadratic, Polynomial, and Separable Objective Functions.* Hagen: FernUniversität, Discussion Paper No. 218, 40 pp.
52. GRUBER J. AND A.S. TANGUIANE A.S. (1995) Constructing a Quadratic Objective Function of Economic Policy. In: Mammitzsch V., and H.Schneeweiß (Ed.) *Simposia Gaussiana, Conf.B., München, August 3–7, 1993.* Berlin–New York: Walter de Gruyter, 313–329.
53. GRUBER J. AND A.S. TANGUIANE A.S. (1995) Constructing an Objective Function of Economic Policy. In: G.Lasker (Ed.) *Research-in-Progress, Vol. II.* Windsor (Canada) The International Institute for Advanced Studies in Systems research, Informatics, and Cybernetics, 99–105.
54. GRUBER J. AND TANGIAN A.S. (1995) Ökonometrisches Forschungsprojekt brachte Nobelpreisträger G. Debreu an die FernUniversität Hagen. *Jahrbuch 1995 der Gesellschaft der Freunde der FernUniversität e.V.*, Hagen, 118–123.
55. TANGIAN A.S. (1996) *Solution to Condorcet’s Paradox for a Large Number of Voters.* FernUniversität Hagen: Discussion Paper No. 232, iv, 20 pp.
56. TANGIAN A.S. (1996) A WINDOWS Program “Constructing Objective Functions”. *Version 1.0. User’s Guide.* FernUniversität Hagen: Discussion Paper No. 233, iv, 47 pp.
57. TANGIAN A.S. (1997) Election of Vice-President and Adding New Members to Representative Bodies. *Social Choice and Welfare*, 14 (1), 23–45.
58. TANGIAN A.S. (1997) Methodological Remarks on Objective Functions. In: Tangian A.S., and J.Gruber (Eds.) *Proceedings of the 3rd International Conference on Econometric Decision Models: Constructing Scalar-Valued Objective Functions, Hagen–Schwerte, September 5–8, 1995.* Berlin: Springer-Verlag, (Lecture Notes in Economics and Mathematical Systems), 9–22.
59. TANGIAN A.S. AND J. GRUBER (1997) Constructing Quadratic and Polynomial Objective Functions. In: Tangian A.S., and J.Gruber (Eds.) *Proceedings of the 3rd International Conference on Econometric Decision Models: Constructing Scalar-Valued Objective Functions, Hagen–Schwerte, September 5–8, 1995.* Berlin: Springer (Lecture Notes in Economics and Mathematical Systems), 166–194.

60. TANGIAN A.S., AND J.GRUBER (EDS.) (1997) *Constructing Scalar-Valued Objective Functions*. Berlin: Springer (Lecture Notes in Economics and Mathematical Systems 453), VIII, 298 pp.
61. TANGIAN A.S. (1997) An Outline of the Mathematical Theory of Democracy and Its Applications. *Group Decision and Negotiation*, 6(3), 205–230.
62. TANGIAN A.S. (1997) *A Fast Algorithm for Restricted Least Squares and Quadratic Programming*. FernUniversität Hagen: Discussion Paper No. 242, iv, 14 pp.
63. TANGIAN A.S. (1997) *Constructing Quadratic Objective Functions Under Monotonicity Restriction*. FernUniversität Hagen: Discussion Paper No. 243, iv, 31 pp.
64. TANGIAN A.S. (1998) *Das Paradox von Arrow und seine Lösung*. FernUniversität Hagen: Discussion Paper No. 262, iv, 12 pp.
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