

# Curriculum vitae of Dr Moussa Larbani



## Part I: Personal Information

- First name and surname: **Moussa Larbani**
- Date and place of birth: 05/12/1961 in Ighil- Imoula, Algeria
- Married, four children
- Citizenship: Algeria

### - Address

Department of Business Administration, Faculty of Economics, IIUM University, Jalan Gombak, Kuala Lumpur, 53100, Malaysia.

### - Affiliation

- 1) University of Tizi-Ouzou, (Algeria), from September 1991 to December 2001
- 2) International Islamic University Malaysia (IIUM), (Malaysia), from December, 2001 to July 10, 2006.
- 3) Kainan University (Taiwan) from August 7, 2006 to July 2007.
- 4) IIUM University (Malaysia), from July, 2007 up till now.

### - Degrees

- **PH.D** in the field of differential equations and Optimal control (from November 1985 to March 1991); obtained march 27, 1991 in Moscow in the former USSR from State University of Odessa, Ukraine.
- **DHS** (Diploma in High Studies in Mathematics, Major in Operations Research) in the period October 1981 to Jun 1985, obtained from USTHB University in 1985, Algeria.
- Baccalaureate in mathematics in Jun 1981 at the end of secondary school;

## - Positions

- January, 2010 till present      **Professor**, at International Islamic University Malaysia.
- July, 2007 to January, 2010    **Associate Professor**, at International Islamic University Malaysia.
- August, 2006 to July, 2007    **Associate Professor**, at Kainan University, Taiwan.
- April, 2006 to July, 2006      **Associate Professor**, at International Islamic University Malaysia.
- Dec., 2001 to July, 2006      **Assistant Professor**, at International Islamic University Malaysia.
- July, 1998 to Dec., 2001      **Associate Professor**, at University of Tizi- Ouzou, Algeria.
- Sept., 1991 to July, 1998      **Assistant Professor**, at University of Tizi-Ouzou, Algeria.

## - Languages Used in Scientific Activities

English, French, and Russian.

## - Computer Sciences

Familiar with Word, Excel, Power point and Latex.

## - Domains of Interest in Research

- Decision making problems involving uncertainty
  - Multiple criteria decision making;
  - Game theory
- Islamic Economics

## A Brief Academic Profile

Through my long years spent on research, teaching and supervising activities at different places and in different environments and cultures in the world, I achieved considerable scientific results and acquired good interaction experiences.

In research, I have made a considerable contribution to game theory by introducing a new model that incorporates the psychological states of players and allows restructuring for reaching good solutions, the second order games. Moreover, I made a considerable breakthrough in decision theory by introducing a decision model that incorporates human psychology and its dynamics, decision making and optimization in changeable spaces. These results came with dedication to research and perseverance. I am versatile in my research activities, however, my main focus is on game theory and multiple criteria decision making. I feel comfortable in doing research in a team and guiding young researchers.

I have been part of some research projects funded by the National Science Council of Taiwan. The theoretical results of these projects were used in the development of an operational management system of trauma patients in large scale events like earthquakes, terrorist attacks, etc. This system is currently effectively working in 32 hospitals in Taiwan.

In terms of teaching, I taught a large number of courses including mathematical, operations research, management sciences and statistics subjects at undergraduate and post graduate levels. The rate of my students' evaluation is most of the time above 80/100. My teaching philosophy is based on three principles: (i) make sure students understand deeply the concepts I teach and

know how to apply them, (ii) strike a balance between easy and difficult questions in examinations and be fair in marking and (ii) entertain mutual respect in interaction, guide good students to achieve their objectives and help the others to do better.

## **H and G -Indexes and Citations (updated on 26/02/2014)**

- My H-index is 10 (Google scholars, my citation)
- The number of citations of my works is 311 (Google scholars, my citations)
- My G-index is 5

## **Part II: Publications**

### **Summary of my main contributions to the body of Knowledge:**

#### **a) Game Theory**

Since 2003, I was developing with professor Po Lung Yu (Kansas University USA and National Chiao Tung University Taiwan) a new model for games, *the second order games*. The second order games are based on states of minds (or psychological states) of players and their charge level (tension or mental stress) instead of strategies and utility function as in traditional games. The concept of equilibrium in these games is *the win-win mind profile*. Unlike Nash equilibrium, it is immune against unilateral and multilateral deviations. Moreover second order games overcome the artificial dichotomy cooperative/non cooperative game of the traditional models and allow the restructuring of the game for reaching solutions. The second order games are a significant departure from the traditional Nash-Von Neumann strategy-utility function framework. Thus, our contribution enlarges the scope of application of game theory to real-world games and conflicts. See papers No 2, and 9-11 below.

#### **b) Decision Making and Optimization**

Most of existing models of decision making do not incorporate psychological states of the Decision Makers (DMs) and their dynamics. Moreover, to represent uncertainty, these models incorporate uncertainty is represented by probabilistic parameters with known probability distribution and/or fuzzy sets with known membership functions. However, real-decision making often involve parameters with unknown shapes and behaviour, which make it impossible to treat using the existing models of decision making and optimization. Such problems are called *decision making in changeable spaces* (DMCS). I and professor Po Lung Yu developed a new a model for DMCS and derived the corresponding optimization models for covering and discovering processes, which encompass most of decision making problems. Our Model incorporates the dynamics of psychological states of the DMs and the environment. In this sense it is a new paradigm. We expect its application in management, game theory, artificial economics and artificial intelligence. It is based on Habitual Domain theory (developed by Po Lung Yu), the decision elements, the notion of competence set and the 7-8-9 mental operators. See the paper No 1, below.

### c) Affinity set

I with Professor Yuh Weh Chen (Da Yeh University) developed a fuzzy set based framework for the commonly known concept of *affinity*. The affinity set has been successfully applied in health care sector to determine the factors that affect delayed diagnosis in emergency room in Taiwan hospitals. See papers 13,16 and 17. It has been also incorporated in the development of an operational management system of trauma patients in large scale accidents and events like earthquakes, terrorist attacks, etc. This system is currently effectively working in 32 hospitals in Taiwan. We expect more applications of affinity set in health care and other sectors.

### 1) Publications in Journals

- 1- A.A. Zaidan, N.N. Ahmad, H. Abdul Karim<sup>a</sup>, M. Larbani, B.B. Zaidan, A. Sali, (2013) On the multi-agent learning neural and Bayesian methods in skin detector and pornography classifier: An automated anti-pornography system, *Neurocomputing*, Available online 8 November 2013.
- 2- Larbani M., Yu P.L., (2012) Decision Making and Optimization in Changeable Spaces, a New Paradigm, *Journal of Optimization Theory and Application (JOTA)*, 155 (3), 727-761.
- 3- Hung-Shun Huang, Moussa Larbani and Po-Lung Yu (2012), Quantification and Applications of identification spheres, *Human Systems Management*, 31 (2), 97-109.
- 4- Larbani M., Yu P.L., (2011)  $n$ -Person Second-Order Games: A Paradigm Shift in Game Theory, *Journal of Optimization Theory and Application (JOTA)*, 149 (3), 447-473.
- 5- M. Larabani, B. Aouni, (2011), A new Method for Generating an Efficient Solution within Goal Programming Model. *Journal of Operations Research Society*, 62, 175-182.
- 6- M. Larbani, Chi-Yo Huang, and Gwo-Hshiung Tzeng, (2011) A Novel Method for Fuzzy Measure Identification, *International Journal of Fuzzy Systems*, 13 (1), 24-34.
- 7- Y-W. Chen, M. Larbani, Liu Chen-Hao (2010), Simulation of a Supply Chain Game with Multiple Fuzzy Goals, *Fuzzy Sets and Systems*, 61, 1489-1510.
- 8- M. Larbani, (2010), Multiobjective Problems with Fuzzy Parameters and Games against Nature, *Fuzzy Sets and Systems*, 161 (20), 2642-2660.
- 9- R. Guettaf, C. Mancel, M. Larbani and F. Mora-Camino (2010), Pricing of ACT/ATM Services through Bi-level Programming Approaches. Invited paper, *Journal of the Brazilian Air Transportation Research Society*, 6 (2), 9-23.

- 10- Yu P.L., Larbani M., (2009) Two-Person Second-Order Games, Part I: Formulation and Transition Anatomy, *Journal of Optimization Theory and Application (JOTA)*, 141, 619-639.
- 11- Larbani M., Yu P.L., (2009) Two-Person Second-Order Games, Part II: Restructuring Operations to Reach a Win-Win Profile, *Journal of Optimization Theory and Application (JOTA)*, 141, 641-659.
- 12- Larbani M. , Yu P.L., (2009) Second-Order Games: Formulation and Solution, *Journal of Nonlinear and Convex Analysis (JNCA)*, 10 (1) 73-91.
- 13- Y-W. Chen, M. Larbani, Y. P. Chang (2009), Multiobjective Data Envelopment Analysis, *Journal of Operations Research Society*, 60, 1556-1566.
- 14- Yuh-Wen Chen, Moussa Larbani, Cheng-Yen Hsieh, Chao-Wen Chen (2009), Introduction of affinity set and its application in data mining example of delayed diagnosis, *Expert Systems and Application*, 36 (8) 10883-10889.
- 15- Larbani M., (2009) Non Cooperative Fuzzy Games in Normal Form: A survey, *Fuzzy Sets and Systems*, 160, 3184-3210.
- 16- Larbani M., (2009), Solving Fuzzy Bimatrix Games by Introducing Nature as a Third Player, *Fuzzy Sets and Systems*. 160, 657–666.
- 17- Larbani M. and Chen Y.W., (2009) A fuzzy framework for the Concept of Affinity, *Applied Mathematical Sciences*, Vol. 3, no. 7, 297 – 316.
- 18- Yuh-Wen Chen Y. W., Larbani M., Shen C.M. and Chen C.W., (2009) Using Affinity Set on Finding the Key Attributes of Delayed Diagnosis, *Applied Mathematical Sciences*. Vol. 3, no. 7, 317 -332.
- 19- Mydin Meera, A.K. and Larbani M. (2009) Ownership effect of Fractional Reserve Banking. *Humanomics*, 25 (2) 101-116 .
- 20- Kacher F., Larbani M., (2008), “Existence of Equilibrium Solution for a non Cooperative Game with Fuzzy Goals and Parameters”, *Fussy Sets and Systems*, 159, 164-176.
- 21- Larbani M., Nessah R. (2008), “"A Note on the Existence of Berge and Berge-Nash Equilibria”, *Mathematical Social Sciences*, Vol. 55, Issue 2, pp. 258-271.
- 22- Nessah R., Larbani M. and Tazdait T., (2007), “A Note on Berge Equilibrium”, *Applied Mathematics Letters*, 20, 926-932.
- 23- Chen, Y.-W. and Larbani, M. (2006), “ Two person Zero-Sum Game Approach for multiple Attribute decision Making Problems”, *Fuzzy Sets and Systems (FSS)*, 157, 34-51.
- 24- Kacher, F. and Larbani, M.(2006), ” Solution Concept for a Non Cooperative Game with Fuzzy Parameters”, *International Game Theory Review (IGTR)*, Vol. 8, No. 3, 489-498.

- 25- Mydin Meera, A.K. and Larbani M.(2006), Part I: Seignorage of Fiat Money and the Maqasid Al Shariah: The Unattainableness of the Maqasid. **Humanomics**, 22 (1), (2006), 17-33.
- 26- Mydin Meera, A.K. and Larbani M. (2006), Part II: Seignorage of Fiat Money and the Maqasid Al Shariah: The compatibility of the Gold Dinar with the Maqasid. **Humanomics**, 22 (2) 84-97.
- 27- Chen, Y. W., Larbani, M. (2005), “Simulating the Performance of Supply Chain with Various Alliances”, The *International Journal of Advanced Manufacturing Technology (IJMAT)*. 25: 803–810.
- 28- Nessah, R. and Larbani, M. (2005), “Generalized  $g$ -Quasivariational Inequality”, *International Journal of Mathematics and Mathematical Sciences (IJMMS)*, 21, 3373-3385.
- 29- Larbani, M. and Askoura, Y. (2004), “A Concept of Solution for a Strategic Cooperative Game Involving Unknown Parameters”, *International Journal of Mathematics, Game Theory and Algebra*, Vol 14, NO 5, 383-396.
- 30- Meera A. K. M., Larbani M. (2004), “The Gold Dinar: The Next Component in Islamic Economics, Banking and Finance”. *Review of Islamic Economics*, Vol. 8, NO 1, 2004, 3-34.
- 31- Larbani, M. Nessah, R. (2001), “ Sur l'équilibre fort selon Berge ”, *RAIRO Operations Research*, 35, 439-451.
- 32- Larbani, M. Lebbah, H. (1999), “A Concept of Equilibrium for a Game under Uncertainty”, *European Journal of Operation Research*, V117, N°1, 145-156.
- 33- Plonikov, V.A. and Larbani, M. (1992), “Justification of one Scheme for Partial Averaging for Systems with Slow and Fast Variables”. *Differential Equations*, vol. 28, N° 3, 1992, 428-432.
- 34- Muhammad-Bashir Owolabi Yusuf, Ahamed Kameel Mydin Meera, Gairuzazmi Mat Ghani, Turkhan Ali Abdul Manap, Moussa Larbani (2012). An analysis of operationalization and acceptability of business to business transaction: a mixed method approach . *American Journal of Applied Sciences* , 9 (9). pp. 1422-1434.

## 2) Refereed Papers Published in Books

- 35- Larbani, M. (1997), “*About the Existence of the Nash - Slater Equilibrium for a non Cooperative Game under Uncertainty*”. « Advances in multiple Objective and Goal Programming », (Ed): R. Caballero , F. Ruiz, R.E. Steuer, Springer - Verlag , Berlin, pp 254 - 262.
- 36- Larbani, M. (1999), “*A Concept of Equilibrium for a Cooperative Game under Uncertainty*”. In the proceedings of the 5<sup>th</sup> International Conference of the Decision Science Institute entitled “ Integrating Technology & Human Decision : Global Bridges Into the 21<sup>th</sup> Century” Volume I, D.K. Despotish, C. Zopounidis (Eds), Athens, Greece, July 4-7, 1999, New Technologies Publisher, Athens.
- 37- Larbani, M. (2000), “*Sur l’existence de l’équilibre de Berge pour un jeu à n- personnes*”. in "optimisation et décision" Actes des deuxièmes journées de recherche opérationnelle Francoro” II Sousse 6-8 Avril 1998, Ben Abdelaziz F., Haouari M. and Mellouli K (Eds) Centre de Publication Universitaire de Tunisie (2000), pp 291-300.
- 38- Larbani, M. and Kacher, F. (2002), “*Some Concepts of Solution for a Game under Uncertainty* ”, in “*Multi objective Programming, Recent Advancements*”, Tadeuse Trzsaskalik And Jerzy Michnik (eds), Physica Verlag, Hedelberg, pp 160-170.
- 39- Larbani, M. and Achemine, F. (2001), “*Solving a Two Person Cooperative Game Under Uncertainty*” in “*Multiple Criteria Decision Making in the New Millennium*” , Murat Koksalan and Stanley Zionts (Eds), Springer Verlag, pp 314-324.
- 40- Chen, Y.-W. Yong, Y. L. and Larbani, M. (2004), “*Simulating the Supply Chain Performance by Game Theory*” , in Applications of Management Science Volume 11, General Editor Kenneth D. Lawrence, Elsevier JAI, pp 211-227.
- 41- Larbani, M. and Nessah, R. (2002), “*About the Berge Strong Equilibrium*”, Proceedings of the International Congress of Mathematicians Game Theory and Applications Satellite Conference ICM 2002, August 14-17, 2002, Qingdao China (Eds) Hongwei Gao et al., Qingdao Publishing House, pp 387-389.
- 42- Nessah, R. and Larbani, M., (2004), “*g-Maximum Equality*”, in Nonlinear Analysis and Convex Analysis” proceedings of the Third International conference NACA2003, Takahashi W. and Tanaka T. (Eds), Yokohama Publisher, pp 391-400.
- 43- Larbani, M. and Askoura, Y. (1999), “*The Concept of WAA-Equilibrium for a Game under Uncertainty*”, in Spectral and Evolutionary Problems, Proceedings of the Ninth Crimean Autumn Mathematical School-Symposium- Vol. 9, Kopachevsky N.D. and Orlov I.V. (Eds), Crimean Academy of Science, pp 189-196.
- 44- Kacher F., Larbani M., (2006), Non Cooperative Game with Fuzzy Goals and Fuzzy Parameters, Proceedings of The XIII Congress of International Association for Fuzzy Set Management and Economy (SIGEF XIII), Hammamet, November 30 to December 2, 2006, pp 853-865.

- 45-** Larbani M., Nessah R. (2007), On a generalization of the Ky Fan's Inequality and its Application to Game Theory, In Proceedings of the Fourth International conference on Nonlinear Analysis and Convex Analysis, NACA2005, W. Takahashi and T. Tanaka (Eds), Yokohama Publishers, Yokohama. pp 305-314.
- 46-** Nessah R., Larbani M., and T. Tazdait (2008), New Sufficient Conditions for the g-maximum Inequality, in the Proceedings of NACA2007, the Fifth International Conference on Nonlinear Analysis and Convex Analysis, W. Takahashi and T. Tanaka (Eds), Yokohama Publishers.
- 47-** Larbani M., Nessah R., (2008), The Ky Fan Minmax Inequality without Convexity Assumption, Actes de la 6<sup>ème</sup> rencontre sur l'analyse mathématique et ses applications (Sixth International Meeting on Mathematical Analysis and its Applications) (RAMA VI), avril 26-28, 2008, Revue Compus, Mouloud Mammeri University, Tizi-Ouzou, Algerie, pp 94-98 .
- 48-** Larbani M., Chen Y.W. (2008). Affinity Set and Its Application, In: Trzaskalik (ed.), Multiple Criteria Decision Making '07, Publisher of The Karol Adamiecki University of Economics in Katowice, pp. 117 – 134.
- 49-** Chen, Y. W., Larbani, M., Lee T-H, Chen, C-W, (2009) “Using Affinity Set on Mining the Necessity of Computed Tomography Scanning,” Proceedings of the IEEE International Conference on Service Operations, Logistics and Informatics, 22-24, July, 2009, Chicago, USA. pp 219-223.
- 50-** Larbani M. And Kacher F., (2010) A Laplace’s Principle Based Approach for Solving Fuzzy Matrix Games, In: Advances in Mathematics Research. Volume 12, Editors: Albert R. Baswell, Nova Science Publishers, Inc.
- 51-** Nessah R. Tazdait T. Larbani M. (2012). Strong Berge equilibrium and strong Nash equilibrium: Their relation and existence. L.A. Petrosjan and V.V. Mazalov (eds.), Game Theory and Applications, Vol. 15, Chap. 12, 165–180, Nova Science Publishers.
- 52-** Larbani M. and Yu P.L., (2014), Effective Decision Making in Changeable Spaces, Covering and Discovering Processes: A Habitual Domain Approach. In Human-Centric Decision-Making Models for Social Sciences, P. Guo and W. Pedrycz (Eds), Studies in Computational Intelligence, Vol. 502, Springer-Verlag Berlin Heidelberg. pp. 131-162, to appear in 2014.



## 4) Communications in Conferences

### A) Talks at Plenary Sessions

- 1) Larbani M., Non Cooperative Fuzzy Games in Normal Form, Plenary Session at the XIII Congress of International Association for Fuzzy Set Management and Economy (SIGEF XIII), Hammamet, November 30 to December 2, 2006.
- 2) Larbani M. And P.L. Yu, *n*-Person Second Order Games: A Paradigm Shift in Game Theory”, Second International Symposium on Operations Research ISOR11. Algiers, Algeria, May 30<sup>th</sup>-June 2<sup>nd</sup>, 2011.
- 3) Larbani M. And P.L. Yu, “Decision Making and Optimization in Changeable Spaces, A new Paradigm”, The 4<sup>th</sup> International Conference on Advancement in Science and Technology, 7<sup>th</sup>-10<sup>th</sup> November, 2012, Kuantan, Malaysia.
- 4) Larbani M. and Yu P.L. Optimization in Changeable Spaces, 9<sup>th</sup> International Conference on Optimization: Techniques and Applications (ICOTA2014), December 12-16, 2013, National Taiwan University of Technology, Taipei, Taiwan.

### B) In International Conferences

- 1- Larbani, M. (1996), “*About the existence of Nash - Slater Equilibrium for a non Cooperative Game under Uncertainty*”. Abstracts of The Second International Conference in Multi - Objective Programming and Goal Programming, MOPGP’96. May 16 - 18 , 1996 Málaga, Spain, pp 72-73.
- 2- Larbani, M., and Kacher, F. (2000), “*Some Concepts of Solution for a Game under Uncertainty*”, In the proceedings of the fourth International Conference MOPGP’00, 29 Jun – 1 May 2000, Ustron Poland, pp 321-328.
- 3- Nessah, R. and Larbani, M. (2005), “ *On a Nonlinear Inequality*”, abstracts of the Fourth International Conference Nonlinear Analysis and Convex Analysis (NACA2005), Okinawa, Japan, Jun 30- July 4, 2005, pp 84.
- 4- Kacher, F. and Larbani, M. (2005), “*A Concept of Solution for a non-cooperative Game with Fuzzy Goals and Parameters*”, Abstracts of the First Spain Italy Netherlands Meeting on Game Theory, Jun 24-26, 2005, Maastricht, Netherlands, pp 7.
- 5- Nessah R. and Larbani M., (2004), “ *On Berge Equilibrium*”, Proceedings of the 35<sup>th</sup> Annual Conference of the Italian Association of Operations Research Society (AIRO2004), September 7-10, 2004, Lecce, Italy. pp 44.
- 6- A Scarelli, A. and Larbani, M. (2004), “*The dynamic Control of the Unfaithfulness in a Cooperative*”, Proceedings of the 35<sup>th</sup> Annual Conference of the Italian Association of Operations Research Society (AIRO2004), September 7-10, 2004, Lecce, Italy. pp 42.

- 7- Lebbah H. , M. Larbani (1998), “ *About a Pareto Optimal Equilibrium for an n- Person Game under Uncertainty* ”. The Third International Conference in Multi Objective Programming and Goal Programming. Quebec City Canada, MOPGP’98, May 31 and June 1-3, 1998.
- 8- Larbani, M. (1996), “ *Théorème d’existence d’un NS- équilibre pour un jeu non coopératif avec paramètres indéterminés* ”. Abstracts of The Fourth International Workshop in Multiple Criteria and Game Problems under Uncertainty , 8-14 September, 1996 Orekhovo - Zuevo, Russia, P 83. ISBN 5-85507-076-X. Edition : Russian Correspondence Institute of Textile and Light Industry.
- 9- Nessah, R., Larbani, M. (2003), “ *g-Maximum Equality* ”. Abstracts of the Third International Conference on Non Linear Analysis and Convex Analysis (NACA), 25-30 August, 2003, Tokyo, Japan, pp 119.
- 10- Larbani, M. (1999), “ *A Concept of Equilibrium for a Cooperative Game under Uncertainty* ”. In the proceedings of the 5<sup>th</sup> International Conference of the Decision Science Institute entitled “ *Integrating Technology & Human Decision : Global Bridges Into the 21<sup>th</sup> Century* ” Volume I, D.K. Despotish, C. Zopounidis (Eds), Athens, Greece, July 4-7, 1999, New Technologies Publisher, Athens, pp 164-167.
- 11- Larbani, M. and Askoura, Y. (2003), “ *A Result on the non Emptiness of the Alpha-Core* ”. Conference book of the XV IMGTA (Italian Meeting on Game Theory and Applications), Urbino, Italy, July 9-12, 2003, pp 52.
- 12- Kacher, F. and Larbani, M. (2003), “ *A Concept of Solution for a non Cooperative Game With Fuzzy Parameters* ”. Conference book of the XV IMGTA (Italian Meeting on Game Theory and Applications), Urbino, Italy, July 9-12, 2003, pp 43.
- 13- Larbani, M. (2000), “ *Sur l’existence de l’équilibre de Berge pour un jeu à n- personnes* ”. in "optimisation et décision" Actes des deuxièmes journées de recherche opérationnelle Francoro” II, Sousse, Tunisia, 6-8 Avril 1998.
- 14- Kacher, F. and Larbani, M. (2006), “ *On a Multiobjective non Cooperative game with Fuzzy Goals and Fuzzy Parameters* ”, Abstracts of the 18<sup>th</sup> International on Multiple Criteria Decision Making, Chania, Greece, Jun 19-23.
- 15- Larbani M., Aouni B., On the Pareto Optimality in Goal Programming. Administrative Sciences Association of Canada Conference 2007 (ASAC 2007), Jun 3-5, 2007, Ottawa.
- 16- Larbani M., Yu P.L., (2007) A Habitual Domain Approach for Two-Person Games, (Invited Speaker) abstracts of the Fifth International Conference Nonlinear Analysis and Convex Analysis (NACA2007), May 31-Jun 4, 2007, Hsinchu, pp 22.
- 17- Larbani M., Nessah R., Tazdait T., (2007) New Sufficient Conditions for the g-maximum Inequality, abstracts of the Fifth International Conference Nonlinear Analysis and Convex Analysis (NACA2007), May 31-Jun 4, 2007, Hsinchu, pp 22.

- 18-** Larbani M., (2007) Non Cooperative Fuzzy Games in Normal Form, Plenary Session at the XIII Congress of International Association for Fuzzy Set Management and Economy (SIGEF XIII), Hammamet, November 30 to December 2, 2006.
- 19-** Kacher F., Larbani M., Non Cooperative Game with Fuzzy Goals and Fuzzy Parameters, The XIII Congress of International Association for Fuzzy Set Management and Economy (SIGEF XIII), Hammamet, Tunisia, November 30 to December 2, 2006.
- 20-** Larbani M., A Game Approach to Fuzzy Multiobjective Problems with Fuzzy Parameters, The XIII Congress of International Association for Fuzzy Set Management and Economy (SIGEF XIII), Hammamet, Tunisia, November 30<sup>th</sup> to December 2<sup>nd</sup>, 2006.
- 21-** Larbani M. Nessah R. (2007), New Sufficient Conditions for the g-Maximum Inequality, The Fifth International Conference on Non Linear Analysis and Convex Analysis (NACA 2007), May 31- Jun 4, 2007, National Tsing Hua University, Hshinchu, Taiwan.
- 22-** Larbani M., (2008) Solving Fuzzy matrix Games by Laplace's Principle of Decision Making under Uncertainty, NAO-Asia2008, Asian Conference on Analysis and Optimization, September 14-18, 2008, Matsue, Japan.
- 23-** Larbani. M. and Chen, Y. W., "Improving the game approach to fuzzy MADM," 19<sup>th</sup> International Conference on Multiple Criteria Decision Making, Auckland University, New Zeland, 2008
- 24-** Larbani M., Nessah R., (2008), The Ky Fan Minmax Inequality without Convexity Assumption, Actes de la 6<sup>eme</sup> rencontre sur l'analyse mathematique et ses applications (Sixth International Meeting on Mathematical Analysis and its Applications) (RAMA VI), avril 26-28, 2008, Mouloud Mammeri University, Tizi-Ouzou, Algerie .
- 26-** Nessah R., Larbani M. Tazdait T., (2009), Strong Berge-Pareto Equilibrium: Existence and Relation with Strong Nash Equilibrium, The Sixth International Conference on Non Linear Analysis and Convex Analysis (NACA 2009), March 27- 31, 2009, Tokyo Institute of Technology, Tokyo.
- 27-** Larbani M., Mustafa Omar M. and Oladokun N.O., (2009), The problems facing the agricultural sector in Nigeria and the prospect of muzara'ah & supply chain model, Global Academy of Business and Economics Research, Fifth International Conference, December, 28-30, Kuala Lumpur, Malaysia.
- 28-** Chen, Y. W., Larbani, M., Lee T-H, Chen, C-W, (2009) "Using Affinity Set on Mining the Necessity of Computed Tomography Scanning," IEEE International Conference on Service Operations, Logistics and Informatics, 22-24, July, 2009, Chicago, USA. (EI)
- 29-** Guettaf R. Larbani M., Mancel C., Mora-Camino F., Bi-level Approach for Pricing ATC/ATM Services in Low Traffic Region, 11th Congress of the French Operations Research and Decision Support Society ROADEF2010 (le onzieme congres de la Societe Francaise de Recherche Operationnelle et d'Aide a la Decision), University of Toulouse, France, 24-26 February 2010.

- 30- Rabah Guettaf, Marina Rodrigues Brochado, Moussa Larbani, Félix Mora-Camino. Pricing of air traffic control services: A dual Inverse Approach Through bilevel programming. Inverse Problems, Design Optimization System, João Pessao, Brazil, August 25-27.
- 31- Larbani M. And Kacher F. Equilibrium Concept for a non Cooperative game with Fuzzy Payoffs, Second Asian Conference on non Linear Analysis and Optimization NAO-ASIA2010, Sept. 9-12, 2010, Phuket, Thailand.
- 32- Larbani M. And P.L. Yu, *n*-Person Second Order Games: A Paradigm Shift in Game Theory”, Second International Symposium on Operations Research ISOR11. Algiers, Algeria, May 30<sup>th</sup>-June 2<sup>nd</sup>, 2011.
- 33- Guettaf R., Larbani M., Jackou-Kaffa R. and Mora-Camino F., (2012). Pricing of Air Control Services through Leveling, *the XVI Latin-Ibero-American Conference on Operations Research and XLIV Brazilian symposium on Operations Research*, Rio De Janeiro, Brazil, September, 24-28.
- 34- Larbani M. and Ben Touhami Meftah J. (2012). Fractional Reserve Banking from Islamic Perspective, Part I: The Prohibition, *3rd Annual world Conference on Riba*, Kuala Lumpur, Malaysia, November, 26-27.
- 35- Ben Touhami Meftah J. and Larbani M. (2012). Fractional Reserve Banking from Islamic Perspective, Part II: The Case against Islamic Banking, *3rd Annual world Conference on Riba*, Kuala Lumpur, Malaysia, November, 26-27.
- 36- Nessah R., Larbani M and Tzdait T. Beta Zp-Equilibrium in Games and its Application, 9<sup>th</sup> International Conference on Optimization: Techniques and Applications (ICOTA2014), December 12-16, 2013, National Taiwan University of Technology, Taipei, Taiwan.
- 37- Khendek M. and Larbai M. Application of Analytical Hierarchy Process (AHP) to Supplier Selection and Behavioral Evaluation, 12<sup>th</sup> International Symposium on the AHP (ISAHP 2014), Istana Hotel, Kuala Lumpur, 23-26 June, 2013.

### **C) Conducting Workshops**

Conducted a workshop on “Multiple Criteria Decision Making Aide and Game Theory” at the Faculty of Economics, Commercial and Management Sciences of Dr Yahia Fares University, Medea, Algeria, April 19-30, 2013.

## D) Awards

- 1) **Best researcher award at department level, 2010, 2009 and 2008.**
- 2) **Highly Commended Award paper by Emerald Literati Network:**  
Mydin Meera, A.K. and Larbani M. (2009) *Ownership effect of Fractional Reserve Banking: An Islamic Perspective*. *Humanomics*, 25 (2) 101-116 .
- 3) **Citation:**  
Award for highest citation in social sciences at IIUM University level, 2011
- 4) **Best paper award:**  
Moussa Larbani, Mustafa Omar Mohammed and Oladokun Nafiu Olaniyi, (2009), The Problems Facing the Agricultural Sector in Nigeria and the Prospect of Muzara'h Supply Chain Model, Global Academy of Business and Economics Research, Fifth International Conference, December, 28-30, 2009, Kuala Lumpur, Malaysia.

## Part III: Research Activities

### A) Period 1985-1991: PhD Thesis Preparation

I began my research activities in the state University of Odessa (Ukraine) in 1986. After one year of preparation in Russian language and mathematics, Professor Plotnikov V.A. proposed me the following theme for the PhD degree: “**Asymptotical Study of Differential Equations with Slow and Fast Variables in Optimal Control Problems**”.

#### **This is an abstract of my PhD thesis.**

Generally, solutions of optimal control problems are constructed by numerical methods. However, even by using the most powerful computers, the construction of a solution of an optimal control of a complex system especially a feed-back control is a serious challenge. On the other hand many real optimal control problems involve some small parameters which characterise the relatively small influence of some factors e.g. forces or masses. This fact offers an opportunity for the use of the methods of the small parameter initiated by H. Poincare in his works on the Celeste Mechanics. These methods give satisfactory approximate solutions and their performance justifies the importance of my research theme. The averaging method is one of the most used of these methods. This method consists in the approximation of the solutions of a non autonomous system by solutions of an autonomous one. In my dissertation I applied this method for the approximation of solutions of differential systems with slow and fast variables and those of optimal control problems involving such variables. I have organised the work as follows. In the first chapter I justified the averaging method for differential systems with slow and fast variables in two cases: the continuous case and the case where there is a discontinuity relatively to the slow variable (over a surface depending upon time or not depending upon it). In chapter 2, the results obtained in the preceding chapter are used for the asymptotical construct a the set of the reachable points of a quasi-linear singular perturbed optimal control with slow and

fast variables, for the justification of the averaging method for an optimal control problem with slow and fast variables and linear-quadratic functional and finally for the asymptotical construction of an optimal control via the approximation of solutions of the Riccati equation by averaging method; the last chapter is devoted to the study of the problem of justification of the averaging method for optimal control with multiple criteria (i.e. with vector functional), such a work has never been undertaken before. My viva took place in February 1991. The results of my thesis were published in some of the papers I have cited above.

I have attended my viva on March 1991. Many of My results have been published. During my work on my thesis I participated to the seminars on optimal control supervised by Professor V.A. Plotnikov.

### **B) From 1991-2003**

Since 1991 I worked in the University of Tizi-Ouzou and integrated the research group on the domain of the “ theory of decision making under uncertainty” supervised by professor V.I. Zhukovskii. My contribution in this group yield many publications and communications (see above).

### **C) From 2003-till present**

Since 2003, I was developing with professor Po Lung Yu a new model for games, *the second order games*. The second order games are based on states of minds of players instead of strategies and utility function as in traditional games. The concept of equilibrium in these games is *the win-win mind profile*. Unlike Nash equilibrium, it is immune against unilateral and multilateral deviations. The second order games are a significant departure from the traditional Nash-Von Neumann strategy-utility function framework. Thus, our contribution enlarges the scope of application of game theory to real-world games and conflicts.

### **D) Projects**

- 1) From 1997 to 2000, I was co-researcher in the project entitled « **Constructive methods of Optimisation in a Turbulent environment and applications** » and supported by the ministry of high studies and research under the number N°B 1501/ 01/ 97. Budget of the project: 1,075 USD
- 2) From 2000 to 2002, I was co-researcher in the project entitled « **Convexity and Optimization in Functional spaces** » and supported by the ministry of high studies and research under the number N°B 1501/ 02/ 2000. Budget of the project: 10,000 USD
- 3) I was co-researcher in the project entitled « **Cybernetic Methods and Optimization** », sponsored by the ministry of high studies and research of Algeria under the number N°B 1501/ 02/ 2000. Budget of the project: 80,000 USD; the duration of the project is 4 years, from 2000 to 2004.

- 4) I have collaborated in the following project:  
 Title of the Project: **Quantitative Studies for Corporate Cooperation and Management in Changeable Space, based on Habitual Domains Theory and Competence Set Analysis.**  
 Amount: 60,000 USD  
 Period: August 1, 2005 to July 31, 2008  
 Project leader: Po Lung Yu  
 Funded by: National Science Council of Taiwan  
 Project identification: NSC 96-2416-H009-013,  
 Status: Completed
- 5) Title of the Project: **Using Choquet Integral to Develop the General AHP**  
 Budget: 15,270 USD  
 Period: 2006/08/01 ~ 2007/07/31  
 Researchers: Chen Y.W. and Moussa Larbani  
 Funded by: National Science Council of Taiwan  
 Project identification: 95-2416-H-212-010,  
 Status: Completed.
- 6) Title of the Project: **Developing the Affinity Set and Its Applications**  
 Budget: Budget: NT\$1,126,000  
 Leader: Yuh Weh Chen, Da Yeh University, Chang Hwa, Taiwan  
 Co-Researcher: Moussa Larbani, Kainan University, IIUM University  
 Identification of the Project: 96-2416-H-212-002-MY2,  
 Sponsor: National Science Council of Taiwan  
 Period: 2007-2009.  
 Status: Completed.

#### **E) Visiting Professor**

- 1) I have been a visiting Professor in the Laboratory of “Habitual Domains” of the **Distinguished Professor Po Lung Yu** at the university National Chiao Tung University in Taiwan from April 8, 2004 to April 20, 2004.
- 2) I have been visiting professor at Kainan University, Taiwan for one year: August 2006 to July 2007.

## **Part IV. Teaching, Supervising and Administrative Activities**

### **1) Teaching activity**

Since 1991, I taught courses of different specialities:

- operations research (graduate level)
- Operations Management
- management science or decision Science (undergraduate level)
- Statistics (post-graduate level)
- Advanced Management Science (DBA)
- game theory (static and dynamic) (postgraduate level)
- multiple criteria optimization (postgraduate level )
- nonlinear optimization (postgraduate level )
- ordinary differential equations (graduate level)
- analysis, calculus, advanced calculus, algebra, linear algebra (graduate level)

## **2) Administrative Assignments**

- I have been a member of the scientific counsel of the institute of exact sciences of University of Tizi-Ouzou during the period 95 - 96.
- Coordinator for quantitative subjects in the Faculty of Economics and Management sciences at IIUM university, 2011-2012.
- Coordinator for publication in the Faculty of Economics and Management sciences at IIUM university since July 2012.

## **3) Supervising Students for Different Degrees**

### **A) PhD degree**

#### **Main Supervisor**

- Kacher, F. « Concepts d'équilibre pour un jeu non coopératif sous forme normale avec paramètres indéterminés flous». PhD Thesis, (2006), University of Tizi-Ouzou, Algeria.

#### **Co-supervisor**

- Mahbubul Haque, The Impact of Supply Chain Management and Knowledge Management Practices on Business Performance in the Pharmaceutical Industry of Bangladesh, (2012), IIUM University, Malaysia.

### **B) Magister degree**

I supervised 8 students for the Magister degree in the domains of game theory, multiple criteria optimization and optimal control. The details of these theses are:

- 1) Kacher, F. «Equilibrium Concept for a Game in Normal Form with a Coalition Structure Involving Unknown Parameters in the Case of Complete Ignorance». Magister Thesis, (1998), University of Tizi-Ouzou, Algeria.



- 2) Achemine, F. "Two person Games under Uncertainty", Magister Thesis, (2000), University of Tizi-Ouzou, Algeria.
- 3) Krim, F., " An in Depth Study of Berge Equilibrium", Magister Thesis, 2001, University of Tizi-Ouzou, Algeria.
- 4) Merabet, D. "Application of Averaging Methods in Optimal Control Problems", Magister Thesis, 2001, University of Tizi-Ouzou, Algeria.
- 5) Merakeb, A. "Multiple criteria Problems with Unknown Parameters", Magister Thesis, (2001), University of Tizi-Ouzou, Algeria.
- 6) Nessah, R. "Minimax Equality and its Applications", Magister Thesis, 2002, University of Tizi-Ouzou, Algeria.
- 7) Askoura, Y. "Solution Concept for Strategic Cooperative Game with or without Unknown Parameters", Magister Thesis, 2003, University of Tizi-Ouzou, Algeria.
- 8) Guettaf, R. "Conception of a Software for Solving Multiple Criteria Problems", Magister Thesis, 2004, University of Tizi-Ouzou, Algeria.
- 9) Oladokun Nafiu Olaniyi, (2009), The Problems Facing the Agricultural Sector in Nigeria and the Prospect of Muzara'ah & Supply Chain Model, Master Thesis, Faculty of Economics and Management Sciences, International Islamic University.
- 10) Saifur Rahman Md., (2011) Microfinance Institutions in Bangladesh: Policies, Analysis and Solutions., Faculty of Economics and Management Sciences, International Islamic University.
- 11) Huang Chao Wei, (2007). Integration of Rough Set and Affinity Set for Data Mining on the Life Cycle and Sales of Bio-Product, Dah Yeh University, Taiwan.