1. GENERAL

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DEGREES

1. BSc. in Mathematics, 4 year course, University of Athens(1st class). Degree: 93%
2. MSc. in Mathematics, King's College University of London (distinction, Lionell Cooper prize). Dissertation: Aspects in fixed point theory". Supervisor: Dr. A.Pears.
3.Phd in Mathematical Control Theory .City University London, Thesis: "Algebrogeometric and topological methods in Control Theory". Supervisor: Prof. N.Karcanias.

EMPLOYMENT

a) **Academic**

- (2016-Today) Associate Professor, Department of Economics, National and Kapodistrian University of Athens (NKUA)
- (2019) Temporary Director, MBA in strategic Management, Dept. of Economics NKUA
- (2016-2019) Visiting Professor University of London, UK
- (2017-2019) Director at Division of Mathematics and Informatics, Dept. Economics, NKUA
- (2013-2016) Permanent Assistant Professor Dept. Economics, NKUA
- (July 2013-June 2015) Marie Curie Research Fellow, The City University London
- (2009-2013) Assistant Professor Dept. Economics, NKUA
- (March 2003-August 2009) Lecturer Dept. Economics, Division of Mathematics and Informatics, NKUA
- (1998-2003) Temporary Lecturer of Mathematics and Informatics, University of Athens, Dept. of Economics. Senior Visiting Fellow, City University.
- (1991-1997) Research Assistant-Research Fellow (Control Eng. Centre, City University, London).

b) Commercial Experience

1. (2017) Management consultant at Eurobank, Greece
2. (2013-2014) Nonexecutive member of the board for HellasSTAT Credit rating agency
3. (2012-2013) Senior Advisor, Hellenic Postbank
4. (2011-2013) Management consultant at Greek Postal Savings Bank (TT Branch Network)
5. (2004-2011) Scientific Director for measuring the T-Bank (former ASPIS-Bank) risk
6. (2001-2011) Director of Risk Management Division (CRO), T BANK (former ASPIS BANK)
7. (1998-2001) Manager (PLANET-ERNST & YOUNG SA) in the McKinsey project of the reengineering of the credit function of the National Bank of Greece.

RESEARCH INTERESTS

1) Algebraic geometry approach for Dynamical and Control Systems. This approach is applied to Control problems which can be expressed in terms of polynomial equations. The generic solvability of these problems may be reduced to an intersection problem on a appropriately defined smooth projective variety, or an equivalent problem of examining the `onto' properties of a certain (real) polynomial map. These type of problems are extremely difficult for two reasons: (a) The underlying space of the intersection problem is usually non-compact and has to be appropriately compactified (b)In control theory, it is normally required that the solutions of the equations are real (and not complex) and ,therefore, the conventional algebraic geometry, which is for algebraically closed fields, cannot be used. Our approach for these type of problems lie in the area of the cohomology theory of manifolds as well as in the area of `blow up' techniques on manifolds. These methods were applied successfully in two longstanding open problems of control theory: (i) pole placement via output feedback and (ii) zero assignment via squaring down. The algebraic equations arising in these problems are of skew- symmetric multilinear nature and the appropriate compactifications were proven to be a Grassmannian (when centralised constant controllers are considered) and a product of Grassmannians (for the decentralised case). In this setting, the generic intersection problems can be naturally translated into height calculations in the corresponding cohomology rings. Additionally, the `blow up' properties of the corresponding algebraic (frequency placing) correspondences may provide stronger conditions for the solvability of the above problems.Extension of this work is focused at the moment at the following areas: (i) Expand the framework and results to the case of fixed dynamic schemes, (ii) Develop the computational aspects (iii) investigate robustness of solutions.

2) Mathematical Modelling and General Systems. The work at the University of Athens and in the financial sector has motivated new interests in the general area of modelling of macroeconomic systems as well as modelling of general nonengineering processes. 1) In the area of macroeconomic systems a very interesting problem related to Systems Theory is the extension of static macroeconomic problems to dynamic ones. 2) The work in the financial sector has created the need for development of mathematical models for decision problems. This models can facilitate the experts in the making of their complex decisions and in their full complexity they have nonlinear, dynamic and mixed integer characteristics. 3) The need to link IT and modelling of Business Processes has been recognised through the work of PRIMA as well as the day to day needs of the consultancy company; this involves on one hand the structural and behavioural modelling of the business processes in such a way to be translatable at the IT level and especially database structures.

3) Decentralised control. The tools developed in 1) have been used for the development of an exterior algebra, algebraic geometry besed approach has provided a new characterisation of fixed modes and new necessary conditions for solvability of assignment problems; work in this area is focused on the

development of the essential algebraic geometry tools, which are not available in the literature. The second approach, based on polynomial (commutative) algebra, has provided some interesting results on the parametrisation of simple coupling stabilising controllers. An important aspect of the work in this area is the development of a control theory based methodology for the structuring of the decentralisation scheme.

4) Stabilisation of large order systems via low order controllers. Although arbitrary pole placement via constant output feedback , can be achieved for systems of relatively small order, stabilisation is possible for systems of any order, provided these systems belong to certain semialgebraic sets. The description of these sets in terms of norm inequalities, as well as the construction of the low order stabilising compensators, is an open problem and may have important implications in the theory of stabilisation of linear systems. To this end, we use techniques from model reduction (Hankel norm approximation etc.), robustness (gap metric bounds etc.), combined with techniques for the constant pole placement problem of 1).

5) Computational methods for Algebraic System theory. The theoretical work in the areas described above is complimented by research activity in the area of computations involved in the above problems. There are three main research directions at the moment: the first deals with the study of the general determinantal assignment problem as a constraint optimisation problem (of particular interest is the sensitivity of algorithms and ability to converge to global solutions), the second deals with system deformation and homotopy continuation methods for solutions of DAP, and third the development of a methodology for algebraic theory computations for Control problems, where there is a fine balance between symbolic and numerical computations

6) Dynamic Economics, Credit Risk and Control. The majority of economic systems have a dynamic behaviour away from the equilibrium. The study of such systems as dynamical systems is very crucial for the understanding of the phenomena. We choose as a case study the banking credit portfolios which historically acquire dynamic behaviour. In short and medium term the balances, bad credit and profitability follow a Markov type dynamical model. In this setting the profitability maximisation under risk constraints can be viewed as an Optimal Control problem.

7) Financial Contagion, Economic Networks Complex Systems. A lot of economic activity and interaction of agents appear in complex networks. Financial or Economic failure may be transmitted through the network interconnections depending on the graph structure and the topology of the network as well as on the distribution of economic factors (funds, capital or other) inside the network. The dynamical system depicting contagion is highly nonlinear and complex and it can be studied either via stochastic simulations or via theoretical tools such as Boolean networks, Graph algebras etc.

8) Nonlinear systems and Koopman Operators. Finite dimensional nonlinear dynamical systems may be linearized without losing any of the system information via infinite dimensional Koopman or Composition operators. This global linearization technique allows the use of Functional analysis tools, spectral theorems, C*Algebras-Operator Algebras techniques and various tools from Operator Theory.

BANKING EXPERIENCE

1998-2001 .Manager with PLANET SA and assigned at the National Bank of Greece, Credit Centre. My duties involved

1. Monitoring the performance of the new credit function in NBG.
2. The analysis and design of the information system for the support of the new credit function of the business banking centre.
3. Monitoring and fine tuning of the credit risk models and the designed information system. The credit risk model was developed using historical data and past experience but it remained to be

tested in modern real cases. The information taken for the live database of the plant provided the bases of testing its validity and its weaknesses.

4. Development of indicators related to credit function's performance as well as development of models to support decision making for various related problems.
5. To lead the project of the support and monitoring of the new process of the large Corporate Banking Centre. The approach developed and knowledge gained in the Business Banking Centre was to be applied to most crucial Centre of the Bank, dealing with the biggest and most strategic of its clients.
6. The calculation and monitoring of the credit risk and the corresponding provisions for all the loans of the Bank.

(2001-2011) Director of Risk Management Division(CRO), T BANK (former ASPIS BANK). Responsible for measuring all the risks (credit, market and Operational) arising from the banking operations as well as for the management of the related IT projects, personnel and all resources of the division. My duties involved

1. Monitoring and measuring the credit, market and operational risks, through processes, systems and regulatory or internal reports.
2. Construction and monitoring of credit scoring and rating models for the portfolios of corporate, consumer and mortgage loans
3. Construction and monitoring of VAR models for market risk for the portfolios of stocks, bonds and mutual funds.
4. Limit setting and monitoring for the various types of transactions based on the above models.
5. Calculation of provisions according to Risk management models compliant to Basel II and IAS
6. Risk monitoring of the various business lines and units.
7. Allocation of capital and capital adequacy according to Basel II.
8. Member of the ALCO and Higher Credit Committee.

(2012-2013) Senior Advisor, Hellenic Postbank. Responsible for the Credit Risk measurement of the Credit Portfolio of T Bank acquired by Hellenic Postbank as well as member of the Credit committee of Hellenic Postbank.

AWARDS and PRIZES

1.Scholarship received from D. Pateras Foundation" for the four years of the Bsc degree.

2.After succeeding in National Examinations in Greece, I was awarded a 3-year scholarship, by the Greek Government, to study for the Phd degree. This scholarship is awarded to one person every year.

3.Received the Lionel Cooper Prize, by the University of London, for the best performance in the field of Functional Analysis within the Colleges of the University of London, for the year 1987-1988.

Journal Publications

1. J.Leventides and N.Karcanias, (1992) A new sufficient condition for arbitrary pole placement by real constant output feedback", Systems and Control Letters : Vol. 18, No. 3, North-Holland.
2. J.Leventides and N.Karcanias, (1993) The Pole Placement Map, its properties, and relationships to System invariants" IEEE Transactions on Automatic Control, Vol. 38, No. 8.
3. J.Leventides and N.Karcanias, (1995) Sufficient conditions for arbitrary Pole assignment by constant decentralised output feedback,. Mathematics of Control for Signals and Systems, 1995,8,222-240.
4. J.Leventides and N.Karcanias. (1995) Global asymptotic linearisation of the pole placement map: A closed form solution for the constant output feedback problem, Automatica, Vol. 31, No. 9, pp 1303-1309.
5. N Karcanias and J Leventides, (1996) Grassmann Invariants, Matrix Pencils and Linear System Properties, Linear Algebra and its Applications,1996,241-243,705-731
6. J.Leventides and N.Karcanias (1998), Dynamic Pole Assignment using Global ,Blow up Linearisation:Low Complexity solutions, Journal of Optimisation Theory and Applications, Vol 96, No 1, pp 57-86.
7. J.Leventides and N.Karcanias (1998), The decentralised Markov parameters and the selection of Control structures, International Journal of Control, Vol 70, No 5, 815-830.
8. J.Leventides, J.Rosenthal and X.Wang (1999), The Pole Placement Problem via PI Feedback Controllers, International Journal of Control, Vol 72 (12) pp. 1065-1077.
9. N. Karcanias, D. Vafiadis and J. Leventides (1999), Algebraic Computations in Linear Control Problems. Algebraic, Algebrogeometric Methods and Symbolic Computations, Encyclopedia of Control and Symbolic Computation, IEE Control Eng. Series 56, pp 273-294.
10. J.Leventides and A. Bounas (2002), An approach for the selection of fuzzy indicator functions in terms of T-Operators and their additive generators, Fuzzy Sets and Systems, Vol 126 (2) pp. 219-224.
11. St. Kotsios and J.Leventides (2004), A feedback policy for a modified Samuelson-Hicks Model, International Journal of Systems Science, vol35, no 16, pp 331-341.
12 J.Leventides (2007), Assigning Frequencies via determinantal equations,: New Counterexamples and invariants, IEEE transactions of AC, Vol 52, issue 3, pp 559-563 .
13. J.Leventides and N.Karcanias (2007), Decentralized dynamic pole assignment with low-order compensators, IMA Journal of Mathematical Control and Information, 24, pp 395-410.
14. J.Leventides and N.Karcanias (2008), Structured squaring down and Zero Assignment, International Journal of Control, Vol 81, Issue 2, pp 294-306
15. J. Leventides, N.Karcanias (2009), Zero assignment of Matrix Pencils by additive structure transformations, Linear Algebra and Its Applications 431, pp 1380-1396.
16. J.Leventides , S. Stavraki, Ch. Pandis (2012), A Control Systems approach for Credit Risk Simulation and Control of a loan portfolio, Journal of Computational Optimization in Economics and Finance, Vol.3, No. 1, pp 13-43.
17. J.Leventides and I. Kollias(2014), Optimal Control indicators for the assessment of the influence of government policy to business cycle shocks, Journal of dynamics and games, Vol1, No. 1,pp 79-104
18. I. Kollias and J.Leventides(2013), A Multivariable System Approach for the Assessment of the Influence of Fiscal Policy to Business Cycle Shocks, International Journal of Sustainable Economies Management, 2(2), pp 22-47.
19 I. Kollias and J.Leventides(2013),Optimal Control Indicators for the Assessment of the Influence of Monetary Policy to Business Cycle Shocks, Journal of Reviews on Global Economics, 2,203-214.

20. K.Lefcaditis, A Tsamis and J.Leventidis (2013), The Evolution of Credit Risk of Greek Bank Business Loan Portfolios of Listed and Unlisted Companies and its Impact on the Capital Requirements of Banks, Journal of Money Investment and banking, Issue 27, pp 169-186.
21. K.Lefcaditis, A Tsamis and J.Leventidis (2014), Concentration risk model for Greek bank's credit portfolio, Journal of Risk Finance,Vol 15,No 1, pp 71-93
22 Leventides, J., Petroulakis, G. & Karcanias, N. (2014). The approximate Determinantal Assignment Problem. Linear Algebra and its Applications, 461, pp. 139-162.
23. J.Leventides and I. Kollias(2015), Approximate pole placement by involution and vector decomposition, IMA Journal of Mathematical Control and Information, March 27 2015, pp1-13.
24. J.Leventides and A.Donatou(2015), The Impact of the Basel Accord on Greek Banks: A Stress Test Study, Journal of Risk and Financial Management, Vol. 8, Iss. 2, pp 181-197.

25. Leventides, J., Petroulakis, G. & Karcanias, N. (2016)., Distance Optimization and the extremal variety of the Grassmann variety, Journal of Optimization Theory and Applications,DOI-10,1007/s10957-015-0840-7,pp 1-16.

26 Karcanias, N., Leventides, J., Milonidis, E. and Meintanis, I. (2016). **Selection of Decentralised Control Structures: Structural Methodologies and Diagnostics.** *IFAC-PapersOnLine*, *49*(9), pp. 80–85. doi:10.1016/j.ifacol.2016.07.498.

27 Karcanias, N., Meintanis, I. and Leventides, J. (2016). **System Degeneracy and the Output Feedback Problem: Parametrisation of the Family of Degenerate Compensators.** *IFAC-PapersOnLine*, *49*(9), pp. 68–73. doi:10.1016/j.ifacol.2016.07.496.

28. J. Leventides, N.Karcanias Approximate decomposability in $\wedge^3 R^6$ and the Canonical Decomposition of 3-vectors, *Linear and Multilinear Algebra*, *64*(12), pp. 2378–2405. doi:10.1080/03081087.2016.1158230).

29. N.Karcanias, J.Leventides(2016), Solution of the Determinantal Assignment Problem using the Grassmann matrices, International Journal of Control, 89(2), pp. 352-367. doi: 10.1080/00207179.2015.1077525

30. Kollias, Iraklis;Camouzis, Elias;Leventides, John Global analysis of solutions on the Cournot-Theocharis duopoly with variable marginal costs.*J. Dyn. Games*4(2017),no. 1,25–39. (Reviewer: Ants Aasma)

31. J. Leventides, Kalliopi Loukaki and Vassilios G. Papavassiliou (2018), Simulating financial contagion dynamics in random interbank networks, Journal of Economic Behavior & Organization

32.Karcanias,Nicos(4-CITY-SCN);Leventides,John(GR-UATH-MEC); Meintanis, Ioannis(4-LND-MCE) Structure assignment problems in linear systems: algebraic and geometric methods.(English summary)*Annu. Rev. Control* 46 (2018), 80–93.

33. E. Camouzis, H. Kollias and I. Leventides, STABLE MANIFOLD MARKET SEQUENCES, Journal of Dynamics and Games, American Institute of Mathematical Sciences, Volume 5, Number 2, April 2018

34. Apostolos G. Christopoulos,Ioannis G. Dokas, Iraklis Kollias, John Leventides, An implementation of Soft Set Theory in the Variables Selection Process for Corporate Failure Prediction Models. Evidence from NASDAQ Listed Firms, Bulletin of Applied Economics, Risk Market Journals, vol. 6(1), pages 1-20, (2019)

35. Dalamagas B., Leventides J., Palaios P., Tantos S., Revising the conventional tax-effort principle, Scottish Journal of Political Economy, doi: 10.1111/sjpe.12239, (2019)

36. Leventides, J., Karcanias, N. and Livada, M. Partially Fixed Structure Determinantal Assignment Problems (DAP). IEEE Transactions on Automatic Control (accepted).

37. J.Leventides "A new embedding of the 3x+1 dynamical system" To appear in the Springer volume:"Discrete Mathematics and Applications" Edited by M.Rassias and A. Raigorodskii.

38. J.Leventides N.Poulios "Diffusion on dynamical interbank loan networks" " To appear in the Springer volume:"Discrete Mathematics and Applications" Edited by M.Rassias and A. Raigorodskii.

39.J.Leventides, M.Livada, C.Poulios, "The dynamics of interbank networks", To appear in the Springer volume:"Discrete Mathematics and Applications" Edited by M.Rassias and A. Raigorodskii.

40. K. Loukaki, J.Leventides and P. Boufounou: "Financial Contagion in Interbank Networks: The case of Erdős - Rényi networks" , To appear in the Volume: "Nonlinear Analysis, Differential Equations, and Applications" of the Springer Book Series: "Springer Optimization and Its Applications".

Papers at Conferences with Peer Review

1. J.Leventides and N.Karcanias, Pole Assignment via PI Controllers, necessary and sufficient conditions" - Proc. IEEE CDC, Dec 1992.
2. N.Karcanias and J.Leventides, Relationships between Grassman and Kronecker invariants of Matrix Pencils" Proceedings of MTNS '93 Regensburg.
3. Leventides and N.Karcanias, Sufficient conditions for pole assignment under Decentralised output Feedback" Proceedings of 32nd IEEE CDC.
4. J.Leventides and N.Karcanias, "The representation of high gains and Related System Properties", in the Proceedings of the 2nd IEEE Med. Symposium on new directions in Control and Automation, June 19-22 1994, Maleme, Chania, Crete, Greece.
5. J.Leventides and N.Karcanias, Improved sensitivity solutions to the global linearisation of the constant pole placement problem (Proceedings of the IFAC conference on System Structure and Control", Nantes, France).
6. J Leventides and N. Karcanias,"Arbitrary pole placement via low order dynamic output feedback controllers" , Proc. of the IEEE CDC New Orleans 1995.
7. J Leventides and N Karcanias, A perturbation method for the solution of the output feedback pole placement problem, Proc. of the IEEE CDC New Orleans 1995.
8. Kyriakopoulos and J Leventides, Control issues for systems of switched inputs, Proc. of the IEEE CDC New Orleans 1995.
9. J.Leventides and N.Karcanias, "Pole assignment of certain MIMO systems of two inputs"Proc. of1996 IEEE Mediterranean Symposium, June 19-22, Chania, Greece.
10. Leventides J.,Karcanias N. And Lampakis E., "Arbitrary pole shifting via decentralised output feedback".Proc of 1996 IFAC, World Congress, San Francisco.
11. J.Leventides and N.Karcanias, Frequency assignment maps, relation to system invariants and bounded complexity solutions, Proc. of the IEEE CDC 1996 Kobe Japan.
12. J.Leventides and N.Karcanias, Decentralised Markov Parameters fixed Modes and Decentralised Plucker Invariants, European Control Conference.

13. N.Karcanias, J.Leventides and S.Milonidis "An Integrated Framework for Input Output and Control Structure Selection: Advanced Control Diagnostics", Proc. of 1997 IEEE Mediterranean Symposium.
14. J.Leventides N. Karcanias and A.Bounas, Symbolic Software tools for determinantal assignment problems with reduced sensitivity, Proc. of 2nd IMACS International Conference on: Circuits Systems and Computers, Athens 1998.
15. J.Leventides and A.Bounas, Minimal representation of the fuzzy cell to cell mapping induced by a dynamical system, Proc. of 2nd IMACS International Conference on: Circuits Systems and Computers, Athens 1998.
16. J.Leventides and N.Karcanias, Arbitrary Pole placement via diagonal feedback controllers:Exact solvability condition for the boundary case n=p, Proc. of 98 Med IEEE conf.
17. J. Leventides and S. Stavraki, Modelling a loan portfolio by dynamical systems, 1st AFE, INEAG Samos 2004.
18. J.Leventides, N.Karcanias and S.Kraounakis, Zero Assignment via Structured Squaring Down Compensation, 2nd Symposium on Systems Structure and Control, Oaxaca 2004.
19. N.Karcanias and J.Leventides, Design of Decentralised Control Schemes: An Algebraic Approach, Proc. IFAC 2005
20. J.Leventides, N.Karcanias and S.Kraounakis, Zero assignment of Matrix Pencils, the case of structured additive transformations, Proc. 44th IEEE CDC, 2005.
21. J. Leventides, S. Stavraki and H.Pandis, A Control Systems approach for Credit Risk Simulation and Control of a loan Portfolio, CFE, Geneva 2007.
22. J. Leventides and S. Stavraki, "Credit Risk Budgeting and Planning via Optimal control Methods", World Congress on Engineering, London 2007.
23. N.Karcanias and J.Leventides, Grassmann Matrices, Determinantal Assignment problem and approximate decomposability. 3rd IFAC Systems Structure and Control Symposium, 2007, Brazil.
24. Leventides, J., Karcanias, N., Modelling Evolution of the 3x+1 Dynamical System Via Markov Partitions, 4th IFAC Symposium on System, Structure and Control (2010).
25. N.Karcanias, J.Leventides and I.Meintanis (2013).Parameterization of Degenerate Solutions for the Determinantal Assignment Problem, IFAC Symposium on System, Structure and Control (SSC2013), Grenoble, France.
26. J.Leventides, I.Meintanis and N.Karcanias (2014).A Quasi-Newton Optimal Method for the Global Linearization of the Output Feedback Pole Assignment,IFAC World Congress 2014, South Africa.
27. J.Leventides, I.Meintanis, N.Karcanias and E.Milonidis (2014). Reduced Sensitivity Solutions to Global Linearization of the Pole Assignment Map,IEEE Mediterranean Conference on Control and Automation (IEEE MED2014), Palermo, Italy.
28. N.Karcanias, J.Leventides and M.Livada, (2014). "*Matrix Pencil Representation of Structural Transformations of Passive Electrical Networks"* N.Karcanias Proceedings of 2014 International Symposium on Communications, Control, and Signal Processing: Special Session on Recent Advances in Control and Applications II, ISCCSP 14, Athens May 21-23.
29. J.Leventides and M.Livada,and N.Karcanias (2014). "*McMillan Degree of Impedance, Admittance of RLC Networks"* Proceedings of 21st International Symposium on Mathematical Theory of Networks and Systems (MTNS 2014), July 7-11, 2014, University of Groningen, The Netherlands
30. N.Karcanias, J.Leventides and M.Livada, (2014).. "*Multi-parameter Structural Transformations of Passive Networks and Natural Frequency Assignment"*. Proceedings of the 22nd Mediterranean Conference MED'14, 16-19 June, 2014, Palermo, Italy.
31. Leventides, J., Livada, M. and Karcanias, N. (2016). Zero Assignment Problem in RLC Networks. IFAC PapersOnLine, 49(9), pp. 92-98. doi: 10.1016/j.ifacol.2016.07.502
32 Karcanias, N., Livada, M. and Leventides, J. (2017). System Properties of Implicit Passive Electrical Networks Descriptions. IFAC-PapersOnLine, 50(1), pp. 9242-9247. doi: 10.1016/j.ifacol.2017.08.1285