

CURRICULUM VITAE

MICHAIL P. MARKAKIS

Date of birth: 13/6/1963

Place of birth: Athens

Family status: Married, 2 children

Telephones: +30 2610431031 (Home), +30 2610962782 (Work)

Email: markakis@upatras.gr

EDUCATION

1981-1986: B.Sc. in Mathematics (Grade: 7.35 /10), **National and Capodistrian University of Athens.**

1986-1987: M.Sc. in Astrophysics and Spatial Techniques, **Université Paris VII.**

1989-1995: Ph.D. in Mechanics and Applied Mathematics (Grade: Excellent),
National Technical University of Athens, Department of Engineering Sciences, Section of Mechanics.

POSITIONS

1992-1996: **Athens College** – Prof. of Mathematics.

1996-1998: **Naval Academy** – Prof. of Theoretical Mechanics.

1996-1999: **Military Academy** – Prof. of Theoretical Mechanics.

1997-2004: **Higher School of Educators & Technologists Engineers (H.S.E.T.E.)**
– Scientific Collaborator.

2000-2002: **National Technical University of Athens (N.T.U.A.), School of Applied Mathematics and Physical Sciences** – Lecturer.

2001-2004: **Technological Educational Institute of Athens** – Scientific Collaborator.

2004-2009: **University of Patras, Department of Engineering Sciences, Section of Applied Mathematics and Mechanics** – Lecturer.

2009-2013: **University of Patras, Department of Engineering Sciences, Section of Applied Mathematics and Mechanics** – Assistant Professor.

2013-today: **University of Patras, Department of Electrical and Computer Engineering** – Assistant Professor.

COURSES

Undergraduate

- Statics, Theoretical Mechanics (Military Academy, Naval Academy).
- Mechanics of Deformable Bodies - Strength of Materials (Higher School of Educators & Technologists Engineers, Department of Mechanical Engineering).
- Applied Dynamics (Higher School of Educators & Technologists Engineers, Department of Mechanical Engineering).
- Mathematics I, II (Higher School of Educators & Technologists Engineers, Department of Electrical Engineering, Department of Civil Engineering).
- Kinematics-Dynamics (National Technical University of Athens, School of Applied Mathematics and Physical Sciences).
- Mathematics I, II (Technological Educational Institute of Athens, Department of Electronics, Department of Surveying, Department of Informatics, Department of Energy Techniques).
- Mathematics I, II (University of Patras, Department of Mechanical Engineering and Aeronautics).
- Mathematics for Economists I, II (University of Patras, Department of Economics).
- Ordinary Differential Equations (University of Patras, Department of Electrical and Computer Engineering).
- Linear Algebra (University of Patras, Department of Electrical and Computer Engineering).
- Complex Analysis (University of Patras, Department of Electrical and Computer Engineering).
- Partial Differential Equations & Transformations (University of Patras, Department of Electrical and Computer Engineering).

Postgraduate

- Elastic Behavior of Materials (National Technical University of Athens, Interdepartmental).
- Classical Mechanics (University of Patras, Department of Engineering Sciences).

RESEARCH PROJECTS - SCHOLARSHIPS

1. 25/11/96-30/9/98: P.EN.E.D. project (via G.S.R.T - General Secretariat of Research and Technology), N.T.U.A.: "*Process of composite materials with short fibres in large strains: from Micromechanics to Macromechanics*" (Code 61/0840), Scientific Coordinator: I. Dafalias, Professor of Mechanics, School of Applied Mathematics and Physical Sciences, N.T.U.A.
2. 15/9/98-30/10/98, 3/1/99-28/2/99: Interdepartmental program of postgraduate studies, N.T.U.A.: "*Computational Mechanics*" (Code 68/0304), Scientific

Coordinator: N. Markatos, Professor, School of Applied Mathematics and Physical Sciences, N.T.U.A.

3. 25/2/00-30/6/00: EPEAEK project (B! C.S.F), H.S.E.T.E.: “*Upgrade of the Studies Program of H.S.E.T.E.*” (Subproject 3, Module 3.1, Action 1α).

4. 1/1/2000-1/1/2001: Postdoctoral scholarship from the State Scholarships Foundation, for research on: “*Construction and application of wavelets functions for the solution of integral and differential equations in Mechanics*”, Scientific Supervisor: G. Tsamasfiros, Professor of Mechanics, School of Applied Mathematics and Physical Sciences, N.T.U.A..

MISCELLANEOUS

- Member of the Hellenic Mathematical Society.
- Very positive comments concerning the publication [B8], on behalf of one of the two referees (2007).
- Thanksgiving on behalf of the Editor of the journal “*International Journal of Non-Linear Mechanics*”, R.W. Ogden (University of Glasgow), regarding the constructive review of a submitted paper (A. Yakhno and L. Yakhno, ‘Homotopy’ of Prandtl and Nadai Solutions) (2009).
- Listing in Who’s Who, Marquis Pub., New Providence, N.J., USA (2010-today).
- Member of the Evaluation Committee of the Department of Engineering Sciences, University of Patras (2010-2013).

SUPERVISOR – COMMITTEE MEMBER OF Ph.D., DIPLOMA THESES

- Supervisor of the Ph.D. thesis entitled: “*Methods for the location of periodic solutions and bifurcation analysis of nonlinear dynamical systems for contemporary problems in Applied Sciences*” elaborated in the Department of Electrical and Computer Engineering, University of Patras (2014-2018).
- Member of seven-member or three-member committees of Ph.D. theses elaborated in the Department of Engineering Sciences, University of Patras (2004-2013).
- Co-supervisor of diploma theses elaborated in the Section of Systems & Automatic Control, Department of Electrical and Computer Engineering, University of Patras.
- Supervisor of diploma theses elaborated in the Department of Mechanical Engineering, H.S.E.T.E. (2000).

RESEARCH INTERESTS

Analytical and numerical techniques and methods for the solution and treatment of nonlinear differential equations in Mechanics of Solids and Fluids, as well as in Physics. Nonlinear dynamics in Applied Sciences. Stability Theory. Bifurcation theory.

SCIENTIFIC WORKS

A. Dissertations

A1. **M. Markakis**, *Production mechanism of the electromagnetic bursts of the type 3, in the solar corona*, M.Sc. Thesis, Université Paris VII, 103 pages, Paris 1987.

A2. **M.P. Markakis**, *Analytical techniques for the solution of nonlinear problems in Mechanics of Solids and Fluids*, Ph.D. Thesis, National Technical University of Athens, III+234 pages, Athens 1995.

B. Publications in international journals with referees

B1. **D.E. Panayotounakos and M. Markakis**, Closed form solutions of the differential equations governing the plastic fracture field in a power-law hardening material with low strain-hardening exponent, *Ingenieur Archiv*, 60 (7) (1990) 444-462.

B2. **D.E. Panayotounakos and M. Markakis**, Analytical solutions of mixed mode plane strain crack problems in elastic perfectly plastic materials, *International Journal of Plasticity*, 7 (8) (1991) 847-863.

B3. **D.E. Panayotounakos and M. Markakis**, Ad hoc closed form solution of the two-dimensional nonlinear steady small perturbation equation in fluid mechanics, *International Journal of Non-Linear Mechanics*, 30 (4) (1995) 597-608.

B4. **D.E. Panayotounakos and M. Markakis**, Nonlinear Unsteady Supersonic Flow Analysis for Slender Bodies of Revolution: Theory, *Mathematical Problems in Engineering*, 3 (3) (1997) 217-241.

B5. **M. Markakis and D.E. Panayotounakos**, Nonlinear Unsteady Supersonic Flow Analysis for Slender Bodies of Revolution: Series Solutions, Convergence and Results, *Mathematical Problems in Engineering*, 3 (6) (1998) 481-501.

B6. **M. Markakis**, On the reduction of non-linear oscillator-equations to Abel forms, *Applied Mathematics and Computation*, 157 (2) (2004) 357-368.

B7. **Dimitrios E. Panayotounakos, Efstathios E. Theotokoglou and Michalis P. Markakis**, Exact analytic solutions for the damped Duffing nonlinear oscillator, *Comptes Rendus Mecanique*, 334 (5) (2006) 311-316.

B8. **M.P. Markakis**, Use of a Strongly Nonlinear Gambier equation for the Construction of Exact Closed Form Solutions of Nonlinear ODEs, *International*

Journal of Mathematics and Mathematical Sciences, vol. 2007, Article ID 59619, (2007) 25 pages, doi:10.1155/2007/59619.

B9. **M.P. Markakis**, Analytical closed form and approximate solutions for quadratic nonlinear first order ODEs, *Journal of Mathematical Sciences: Advances and Applications*, 1 (1) (2008) 153-165.

B10. **M.P. Markakis, A.E. Perdiou and C.N. Douskos**, The photogravitational Hill problem with oblateness: equilibrium points and Lyapunov families, *Astrophysics and Space Science*, (2008) 10 pages, doi: 10.1007/s10509-008-9831-6.

B11. **M.P. Markakis**, Closed-form solutions of certain Abel equations of the first kind, *Applied Mathematics Letters*, 22 (2009) 1401-1405.

B12. **M.P. Markakis**, Approximate Ad Hoc Parametric Solutions for Nonlinear First Order PDEs Governing Two Dimensional Steady Vector Fields, *Mathematical Problems in Engineering*, vol. 2010, Article ID 874540, (2010) 23 pages, doi:10.1155/2010/874540.

B13. **M.P. Markakis**, Exact Solutions for Certain Nonlinear Autonomous Ordinary Differential Equations of the Second Order and Families of Two-Dimensional Autonomous Systems, *International Journal of Differential Equations*, vol. 2010, Article ID 436860, (2010) 13 pages, doi:10.1155/2010/436860.

B14. **T. Asada, V. Kalantonis, M. Markakis and P. Markellos**, Analytical expressions of periodic disequilibrium fluctuations generated by Hopf bifurcations in economic dynamics, *Applied Mathematics and Computation*, 218 (2012) 7066-7077.

B15. **M.P. Markakis and P.S. Douris**, Stability and Analytical Approximation of Limit Cycles in Hopf Bifurcations of Four-dimensional Economic Models, *Applied Mathematical Sciences*, 8 (80) (2014) 3967-3990.

B16. **Michail P. Markakis and Panagiotis S. Douris**, On the Computation of Degenerate Hopf Bifurcations for n-Dimensional Multiparameter Vector Fields, *International Journal of Mathematics and Mathematical Sciences*, vol. 2016, Article ID 7658364, (2016) 12 pages, doi:10.1155/2016/7658364.

B17. **M.P. Markakis and P.S. Douris**, An efficient center manifold technique for Hopf bifurcation of n-dimensional multi-parameter systems, *Applied Mathematical Modelling*, 50 (2017) 300-313, doi:10.1016/j.apm.2017.05.036.

B18. **M.P. Markakis and P.S. Douris**, Hopf Bifurcation Analysis of a New SEIRS Epidemic Model with Nonlinear Incidence Rate & Nonpermanent Immunity, *International Journal of Mathematics and Mathematical Sciences*, vol. 2018, Article ID 1467235, (2018) 13 pages, doi:10.1155/2018/1467235.

B19. **P.S. Douris and M.P. Markakis**, High Order Boundary Conditions Technique for the Computation of Global Homoclinic Bifurcation, *Journal of Applied Mathematics and Physics*, 6 (2018) 554-572, doi:10.4236/jamp.2018.63049.

B20. **P.S. Douris and M.P. Markakis**, Computation of a Point-to-Point Homoclinic Orbit for a Semiconductor Laser Model, *Applied Mathematics*, 9 (2018) 1258-1269, doi:10.4236/am.2018.911082.

B21. **P.S. Douris and M.P. Markakis**, Global Connecting Orbits of a SEIRS Epidemic Model with Nonlinear Incidence Rate and Nonpermanent Immunity, *Engineering Letters*, vol. 27, no 4 pp. 866-875, 2019.

F. Publications in Proceedings of international conferences with referees

Γ1. **M.P. Markakis**, Analytical Parametric Solution of the Full Two Dimensional Non-Linear Steady Small Perturbation Equation in Fluid Mechanics, *Computational Engineering in Systems Applications, July 9-11, 2003, Lille, France*, CD: 2-9512309-5-8.

Γ2. **M.P. Markakis**, On the Reduction of Non-Linear Oscillator-Equations to Abel forms, *The 6th Hellenic European Conference on Computer Mathematics and its Applications, September 25-27, 2003, Athens, Greece, 570-579*.

Γ3. **Michalis P. Markakis, Dimitrios E. Panayotounakos and Myron Papadopoulos**, Exact Analytic Solutions of the Unforced Damped Duffing Nonlinear Oscillator, *The 3rd International Conference on Nondestructive Testing, October 15-17, 2003, Chania, Greece, 419-430*.

Γ4. **Michalis P. Markakis, Nina D. Panayotounakou and Dimitrios E. Panayotounakos**, Exact Analytic Solutions of the Free Van der Pol Nonlinear Oscillator, *The 3rd International Conference on Nondestructive Testing, October 15-17, 2003, Chania, Greece, 431-442*.

Γ5. **Dimitrios E. Panayotounakos, Ioannis Vardoulakis and Michalis Markakis**, Nonlinear Gas Pressure Diffusion-Exact Analytic Solutions, *The 3rd International Conference on Nondestructive Testing, October 15-17, 2003, Chania, Greece, 356-366*.

Γ6. **M.P. Markakis**, White Dwarf's Equation. An analytical mathematical approach, *Influence of Traditional Mathematics and Mechanics on Modern Science and Technology, May 24-28, 2004, Messini, Greece, 399-405*.

Γ7. **M.P. Markakis**, Exact Solutions of Certain Nonlinear Autonomous Ordinary Differential Equations of the Second Order, *8th AIMS International Conference on Dynamical Systems, Differential Equations and Applications, May 25-28, 2010, Dresden, Germany*.

Γ8. **C. Douskos, M. Markakis and E. Perdios**, Exotic Equilibrium Points of Restricted Three-Body Problem Variants and Fractal Basins, *2nd International*

Symposium RA'11 on Rare Attractors and Rare Phenomena in Nonlinear Dynamics, May 16-20, 2011, Riga-Jurmala, Latvia, 85-88.

Γ9. **M.P. Markakis and P.S. Douris**, Hopf and homoclinic bifurcation of a new SEIRS epidemic model, *The 17th International Conference on Computational and Mathematical Methods in Science and Engineering, July 4-8, 2017, Cadiz, Spain, 2180-2193.*

Δ. Scientific book editing

Δ1. Y.A. Cengel & W.J. Palm III, *Differential Equations for Scientists and Engineers*, Tziolas, Thessaloniki, 2016.

Δ2. E. Kreyszig, *Advanced Engineering Mathematics*, Tziolas, Thessaloniki, 2018.

E. Textbooks

E1. **M.P. Markakis**, *Classical Mechanics* (Kinematics and Dynamics of Material Point and Rigid Body), Detailed notes for the undergraduate course “Applied Dynamics”, Department of Mechanical Engineering, H.S.E.T.E., 68 pages, Athens 1998.

E2. **M.P. Markakis**, *Stresses and Strains in Elastic Bodies*, Detailed notes for the undergraduate course “Mechanics of Deformable Bodies-Strength of Materials”, Department of Mechanical Engineering, H.S.E.T.E., 64 pages, Athens 1999.

E3. **M.P. Markakis**, *Elastic Behavior of Materials*, Detailed notes for the relevant course of the Interdepartmental program of postgraduate studies of N.T.U.A., entitled: “Computational Mechanics”, 73 pages, Athens 1999.

REFeree IN INTERNATIONAL SCIENTIFIC JOURNALS

Reviewer in:

- International Journal of Non-Linear Mechanics
- Demonstratio Mathematica
- Mathematical Problems in Engineering
- Nonlinear Dynamics
- Applied Mathematic and Computation