

# Nikolaos I. Ioakimidis



Professor Emeritus

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Nikolaos I. Ioakimidis was born in Kallithea, Athens, Greece (1950). He holds a diploma of Mechanical–Electrical Engineer (1973) and a diploma of Doctor Engineer (1976) both from the [National Technical University of Athens](#). His thesis concerns crack problems in elasticity and related numerical methods based on integral equations. He is Professor Emeritus of the [School of Engineering](#) of the [University of Patras](#) since 2013.

He worked as a research assistant (1976) and next as a senior assistant at the Laboratory for Testing Materials and the Chairs of Mechanics A and B (1976–1980) of the [National Technical University of Athens](#). Next, after his election (1980) he served at the [School of Engineering](#) of the [University of Patras](#) (1980–1982) and at the [Division of Applied Mathematics and Mechanics](#) of the [Department of Engineering Sciences](#) of the [School of Engineering](#) as a professor without tenure (1982–1983) and as a professor (1983–2012). During this period (1980–2012) he taught many undergraduate courses in mathematics and applied mathematics at several Departments of the [School of Engineering](#) of the [University of Patras](#) including the two undergraduate courses Applied Mathematics II and III (of the second and the third semester respectively) at the [Department of Civil Engineering](#), which he taught for many years. He also taught for many years the postgraduate course [Applied Mathematics](#) again at the [Department of Civil Engineering](#).

He is the author of two extensive books (in Greek) on Applied Mathematics II for Civil Engineers (2008: [volume 1](#), main volume, [volume 2](#) and [volume 3](#)) and on Applied Mathematics III for Civil Engineers (2008: [volume 1](#), main volume, and [volume 2](#)) appropriate for the corresponding aforementioned two courses. These books concern ordinary and partial differential equations as well as introductions to integral equations and to complex variables with an emphasis on various (including specialized) civil engineering applications. A powerful computer algebra system, [Mathematica](#), is extensively used in these books. Second and extended editions of these books appeared in 2012 (with additional applications and exercises).

Nikolaos I. Ioakimidis is also the author or co-author of more than 250 publications most of which (about 200) are ordinary research papers published in many international refereed scientific journals. His publications received more than 1700 citations (excluding self-citations and citations by his co-authors and colleagues). He has an  $h$ -index = 27 computed from the data of [Google Scholar](#) ([web page of Nikolaos I. Ioakimidis at Google Scholar](#)), but where self-citations are also taken into account. The exclusion of all self-citations and citations by his co-authors and colleagues reduces this value to  $h^*$ -index = 21. 134 of his publications are mentioned in [Mathematical Reviews](#) (MR by the [American Mathematical Society](#), [MathSciNet](#) on the web) and 163 are mentioned in [Zentralblatt für Mathematik](#) (ZM by the [European Mathematical Society](#) et al., [zbMATH](#) on the web). Moreover, 210 of his publications are mentioned in the very well-known [Scopus](#) scientific database of the publishing house [Elsevier](#).

His primary research interests include the numerical solution of Cauchy-type singular integral equations and hypersingular integral equations (mainly by using numerical integration rules) and their applications to crack problems, fracture mechanics (including the experimental method of caustics), plane elasticity, numerical integration, the computation of zeros of analytic functions, complex and real path-independent integrals in fracture mechanics and applications of computer algebra software ([Derive](#), [Reduce](#), [Maple](#) and [Mathematica](#)) to many applied mechanics problems. His current research interests concern mainly the application of available modern quantifier elimination algorithms to additional areas of applied mechanics such as beams on elastic foundation, buckling of columns and vibrations of beams, the Rayleigh–Ritz method and the related Rayleigh quotient, structural stability and structural optimization.

Nikolaos I. Ioakimidis served as a reviewer for the two review journals [Applied Mechanics Reviews](#) and [Mathematical Reviews](#) and also as a member of the Editorial Board of the journal [International Journal of Solids and Structures](#). Moreover, he served as a referee for many research papers submitted for possible publication in 23 scientific journals.

## Selected Publications

1. Ioakimidis, N. I. (2017), "Caustics, Pseudocaustics and the Related Illuminated and Dark Regions with the Computational Method of Quantifier Elimination". *Optics and Lasers in Engineering*, Vol. **88**, pp. 280–300. [[home page](#)]
2. Ioakimidis, N. I. (2016), "Derivation of Conditions of Complete Contact for a Beam on a Tensionless Winkler Elastic Foundation with *Mathematica*". *Mechanics Research Communications*, Vol. **72**, pp. 64–73. [[home page](#)]
3. Ioakimidis, N. I. (2009), "Quantifier-free Formulae for Inequality Constraints inside Boundary Elements". In Manolis, G. D. and Polyzos, D. (editors), *Recent Advances in Boundary Element Methods. A Volume to Honor Professor Dimitri Beskos*. Springer, Dordrecht, pp. 209–222. [[home page of the book](#), [home page of the paper](#), [zbMATH](#)]
4. Ioakimidis, N. I. (2001), "Finite Differences/Elements in Classical Beam Problems: Derivation of Feasibility Conditions under Parametric Inequality Constraints with the Help of Reduce and REDLOG". *Computational Mechanics*, Vol. **27**, No. 2, pp. 145–153. [[home page](#), [zbMATH](#)]
5. Ioakimidis, N. I. (2000), "On the Efficient Computation of the Stress Components near a Closed Boundary in Plane Elasticity by Using Classical Complex Boundary Integral Equations". *International Journal for Numerical Methods in Engineering*, Vol. **47**, No. 11, pp. 1865–1885. [[home page](#), [zbMATH](#)]
6. Ioakimidis, N. I. (1998), "Classical Numerical Methods in Engineering: A Note on Existential Quantifier Elimination under Parametric Inequality Constraints". *Communications in Numerical Methods in Engineering*, Vol. **14**, No. 2, pp. 103–134. [[home page](#), [zbMATH](#)]
7. Ioakimidis, N. I. (1997), "Quantifier Elimination in Applied Mechanics Problems with Cylindrical Algebraic Decomposition". *International Journal of Solids and Structures*, Vol. **34**, No. 30, pp. 4037–4070. [[home page](#), [zbMATH](#)]
8. Ioakimidis, N. I. (1995), "Remarks on the Gauss Quadrature Rule for a Particular Class of Finite-Part Integrals". *International Journal for Numerical Methods in Engineering*, Vol. **38**, No. 14, pp. 2433–2448. [[home page](#), [zbMATH](#)]
9. Ioakimidis, N. I. (1993), "Elementary Applications of MATHEMATICA to the Solution of Elasticity Problems by the Finite Element Method". *Computer Methods in Applied Mechanics and Engineering*, Vol. **102**, No. 1, pp. 29–40. [[home page](#), [zbMATH](#)]
10. Ioakimidis, N. I. (1990), "Two-Dimensional Principal Value Hypersingular Integrals for Crack Problems in Three Dimensional Elasticity". *Acta Mechanica*, Vol. **82**, No. 1–2, pp. 129–134. [[home page](#), [zbMATH](#)]
11. Ioakimidis, N. I. (1988), "A Unified Riemann–Hilbert Approach to the Analytical Determination of Zeros of Sectionally Analytic Functions". *Journal of Mathematical Analysis and Applications*, Vol. **129**, No. 1, pp. 134–141. [[home page](#), [zbMATH](#)]
12. Ioakimidis, N. I. (1985) "On the Uniform Convergence of Gaussian Quadrature Rules for Cauchy Principal Value Integrals and Their Derivatives". *Mathematics of Computation*, Vol. **44**, No. 169, pp. 191–198. [[home page](#), [zbMATH](#)]
13. Ioakimidis, N. I. (1983), "An Improvement of Kalandiya's Theorem". *Journal of Approximation Theory*, Vol. **38**, No. 4, pp. 354–356. [[home page](#), [zbMATH](#)]
14. Ioakimidis, N. I. (1983), "A Natural Interpolation Formula for the Numerical Solution of Singular Integral Equations with Hilbert Kernel". *BIT (Nordisk Tidskrift for Informationsbehandling)*, Vol. **23**, No. 1, pp. 92–104. [[home page](#), [zbMATH](#)]
15. Ioakimidis, N. I. (1982), "Application of Finite-Part Integrals to the Singular Integral Equations of Crack Problems in Plane and Three-Dimensional Elasticity". *Acta Mechanica*, Vol. **45**, No. 1–2, pp. 31–47. [[home page](#), [zbMATH](#)]
16. Ioakimidis, N. I. (1981), "On the Numerical Evaluation of Derivatives of Cauchy Principal Value Integrals". *Computing*, Vol. **27**, No. 1, pp. 81–88. [[home page](#), [zbMATH](#)]
17. Theocaris, P. S. and Ioakimidis, N. I. (1977), "Numerical Integration Methods for the Solution of Singular Integral Equations". *Quarterly of Applied Mathematics*, Vol. **35**, No. 1, pp. 173–183. [[home page](#), [zbMATH](#)]