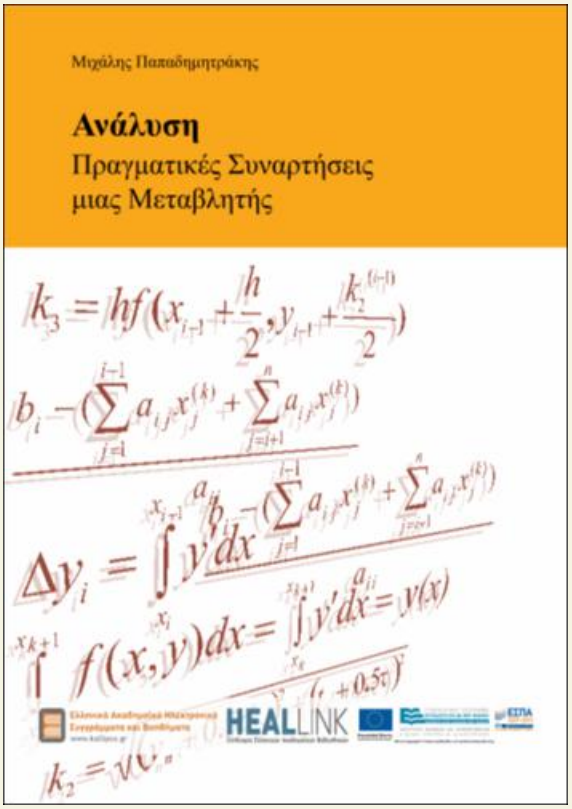


## METADATA

**Title:** Analysis

**Other Titles:** Real Functions of one Variable

**Language:** Greek

**ISBN:** 978-960-603-403-9

**Subject:** MATHEMATICS AND COMPUTER SCIENCE

**Keywords:** Limit / Continuity / Integral / Derivative / Sequence

**Bibliographic Reference:** Papadimitrakis, M. (2015). Analysis [Undergraduate textbook]. Kallipos, Open Academic Editions. http://dx.doi.org/10.57713/kallipos-739

**Abstract**

The classical content of Infinitesimal Calculus (mainly of functions of one variable) with an empasis on the rigorous foundations and on the theoretical proofs of theorems. The supremum property. Existence of roots. Rigorous definition of powers with rational and irrational exponents and of logarithms. Sequences (monotonic, Cauchy, the Bolzano-Weierstrass theorem, limsup-liminf). Limits of functions (monotonicity, Cauchy criterion). Continuity of functions and the basic theorems. Continuity of the inverse function. Uniform continuity. Derivative and the basic theorems. Monotonicity. Convexity. Indeterminate forms. Taylor's theorems. Integral. Methods of Darboux and of Riemann. Properties of the integral. Relation between derivative and integral. Calculation of integrals. Series of numbers. Criteria of convergence. Sequences of functions. Uniform convergence. The theorem of Weierstrass. Series of functions. Uniform convergence. Criteria of convergence. Power series. Trigonometric functions. Metric spaces. Completeness. Compactness. Connectedness. Generalised integrals. Criteria of convergence. Integrals with parameter. Axiomatic foundation. Dedekind cuts.

The Project is funded by the National Development Programme 2021-2025 of the Ministry of Education and Religious Affairs and implemented by the Special Account for Research Funds of the National Technical University of Athens and the Hellenic Academic Libraries Link.