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Linear and nonlinear functional analysis with applications pdf

This comprehensive textbook delves into the fundamentals of linear and nonlinear functional analysis, showcasing numerous applications to partial differential equations, numerical analysis, and optimization theory. The book features self-contained proofs for most theorems, 401 problems, and 52 figures, making it an ideal resource for advanced undergraduates, graduate students, and researchers. With its pedagogical appeal and historical notes providing context, this single-volume textbook is suitable for teaching or self-study. The publication covers core topics from functional analysis, including real analysis, normed vector spaces, Banach spaces, inner-product spaces, and more. The book concludes with bibliographical notes, a bibliography, main notations, and an index. Recent research has applied functional analysis to various fields, such as wireless signal correlation learning frameworks for multi-modal sensing and sharp-interface limits of multi-phase spectral shape optimization problems for elastic structures. Additionally, scalarization in multi-task learning and truncated power methods have been studied. The textbook's topics are relevant to current research and its applications. 1. Liu X, et al. (2024). A Wireless Signal Correlation Learning Framework for Accurate and Robust Multi-Modal Sensing, IEEE Journal on Selected Areas in Communications, 42:9. 2. Garcke H, et al. (2024). Sharp-Interface Limit of a Multi-phase Spectral Shape Optimization Problem for Elastic Structures, Applied Mathematics and Optimization, 89:1. 3. Hu Y, et al. (2023). Revisiting scalarization in multi-task learning Proceedings of the 37th International Conference on Neural Information Processing Systems. 4. Huang J, Wu G (2023). Truncated and Sparse Power Methods with Partially Updating for Large and Sparse Higher-Order PageRank Problems, Journal of Scientific Computing, 95:1. 5. Yue J, et al. (2022). Global Optimal Consumption–Portfolio Rules with Myopic Preferences and Loss Aversion, Computational Economics, 60:4. 6. Colmenares E, Gatica G, Rojas J (2022). A Banach spaces-ased mixed-primal finite element method for the coupling of Brinkman flow and nonlinear transport, Calcolo: a quarterly on numerical analysis and theory of computation, 59:4. 7. Badea L (2022). On the ... (Note: I have removed spam/junk content that does not fit into the article and only kept the paraphrased text in the main language) 1. A novel pseudostress-based mixed-primal finite element method for solving stress-assisted diffusion problems in Banach spaces has been proposed by Gatica et al. 2. The authors have applied this method to a two-dimensional tidal dynamics system with state constraints of integral type, obtaining results that align with Pontryagin's maximum principle. 3. Another study by Feng et al. has introduced a nonconforming virtual element method for a fourth-order hemivariational inequality in the Kirchhoff plate problem. 4. Lie et al. have developed randomized one-step time integration methods for deterministic operator differential equations, which have been verified through numerical simulations. 5. A new fully-mixed finite element method for coupled flow-transport problems has been presented by Benavides et al., which is non-augmented and momentum-conserving. 6. The authors of Cao et al.'s paper on neural information processing systems have proposed a novel approach to solve the Steady Double-Diffusive Convection System Based upon Brinkman–Forchheimer Equations. 7. Several other researchers have contributed to the understanding of incompressible bi-viscous fluids, time optimal control of two-dimensional convective Brinkman–Forchheimer equations, and preconditioned accelerated gradient descent methods for nonlinear PDEs. Given article text here Computing, 85:2, Online publication date: 1-Nov-2020. Gatica G and Inzunza C (2020). An augmented fully-mixed finite element method for a coupled flow-transport problem, Calcolo: a quarterly on numerical analysis and theory of computation, 57:1, Online publication date: 27-Jan-2020. Hrnčíř J, Pultarová I and Strakoš Z (2019). Decomposition into subspaces preconditioning: abstract framework, Numerical Algorithms, 83:1, (57-98), Online publication date: 1-Jan-2020. Pichi F and Rozza G (2019). Reduced Basis Approaches for Parametrized Bifurcation Problems held by Non-linear Von Kármán Equations, Journal of Scientific Computing, 81:1, (112-135), Online publication date: 1-Oct-2019. Komander B, Lorenz D and Vestweber L (2019). Denoising of Image Gradients and Total Generalized Variation Denoising, Journal of Mathematical Imaging and Vision, 61:1, (21-39), Online publication date: 1-Jan-2019. Sprengel M, Ciaramella G and Borzì A (2018). Investigation of Optimal Control Problems Governed by a Time-Dependent Kohn-Sham Model, Journal of Dynamical and Control Systems, 24:4, (657-679), Online publication date: 1-Oct-2018. Almonacid J, Gatica G and Oyarzúa R (2018). A mixed---primal finite element method for the Boussinesq problem with temperature-dependent viscosity, Calcolo: a quarterly on numerical analysis and theory of computation, 55:3, (1-42), Online publication date: 1-Sep-2018. Papeź J, Strakoš Z and Vohralík M (2018). Estimating and localizing the algebraic and total numerical errors using flux reconstructions, Numerische Mathematik, 138:3, (681-721), Online publication date: 1-Mar-2018. De Los Reyes J, Loayza E and Merino P (2017). Second-order orthant-based methods with enriched Hessian information for sparse $$\ell _1$$ℓ1-optimization, Computational Optimization and Applications, 67:2, (225-258), Online publication date: 1-Jun-2017. Nicomedes W, Bathe K, Moreira F and Mesquita R (2017). Meshfree analysis of electromagnetic wave scattering from conducting targets, Computers and Structures, 184:C, (36-52), Online publication date: 1-May-2017. Merger J and Borzì A (2017). Dynamics Identification in Evolution Models Using Radial Basis Functions, Journal of Dynamical and Control Systems, 23:2, (317-335), Online publication date: 1-Apr-2017. Colmenares E, Gatica G and Oyarzúa R (2017). An augmented fully-mixed finite element method for the stationary Boussinesq problem, Calcolo: a quarterly on numerical analysis and theory of computation, 54:1, (167-205), Online publication date: 1-Mar-2017. Discacciati M and Oyarzúa R (2017). A conforming mixed finite element method for the Navier---Stokes/Darcy coupled problem, Numerische Mathematik, 135:2, (571-606), Online publication date: 1-Feb-2017. Fu Y, Rdulescu V and Zhang B (2015). Hodge decomposition of variable exponent spaces of Clifford-valued functions and applications to Dirac and Stokes equations, Computers & Mathematics with Applications, 70:4, (691-704), Online publication date: 1-Aug-2015. Chern A, Pinkall U and Schröder P (2015). Close-to-conformal deformations of volumes, ACM Transactions on Graphics, 34:4, (1-13), Online publication date: 27-Jul-2015.