Neural-Based Orthogonal Data Fitting: The EXIN Neural Networks

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E-Book	978-1-118-09774-8	April 2011		$91.99
Hardcover	978-0-471-32270-2	November 2010	*Out of stock*	$114.25
O-Book	978-0-470-63828-6	June 2011		**Available on Wiley Online Library**

📖 DESCRIPTION

The presentation of a novel theory in orthogonal regression

The literature about neural-based algorithms is often dedicated to principal component analysis (PCA) and considers minor component analysis (MCA) a mere consequence. Breaking the mold, *Neural-Based Orthogonal Data Fitting* is the first book to start with the MCA problem and arrive at important conclusions about the PCA problem.

The book proposes several neural networks, all endowed with a complete theory that not only explains their behavior, but also compares them with the existing neural and traditional algorithms. EXIN neurons, which are of the authors' invention, are introduced, explained, and analyzed. Further, it studies the algorithms as a differential geometry problem, a dynamic problem, a stochastic problem, and a numerical problem. It demonstrates the novel aspects of its main theory, including its applications in computer vision and linear system identification. The book shows both the derivation of the TLS EXIN from the MCA EXIN and the original derivation, as well as:

- Shows TLS problems and gives a sketch of their history and applications

- Presents MCA EXIN and compares it with the other existing approaches

- Introduces the TLS EXIN neuron and the SCG and BFGS acceleration techniques and compares them with TLS GAO

- Outlines the GeTLS EXIN theory for generalizing and unifying the regression problems

- Establishes the GeMCA theory, starting with the identification of GeTLS EXIN as a generalization eigenvalue problem

In dealing with mathematical and numerical aspects of EXIN neurons, the book is mainly theoretical. All the algorithms, however, have been used in analyzing real-time problems and show accurate solutions. *Neural-Based Orthogonal Data Fitting* is useful for statisticians, applied mathematics experts, and engineers.

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