1.	Record Nr.	UNINA9910814775103321
	Autore	Alexandridis Antonis K.
	Titolo	Wavelet neural networks : with applications in financial engineering, chaos, and classification / / Antonis K. Alexandridis, Achilleas D. Zapranis
	Pubbl/distr/stampa	Hoboken, New Jersey : , : John Wiley & Sons, , 2014 ©2014
	ISBN	1-118-59550-5 1-118-59627-7
	Descrizione fisica	1 online resource (263 p.)
	Disciplina	006.3/2
	Soggetti	Wavelets (Mathematics) Neural networks (Computer science) Financial engineering
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Note generali	Includes index.
	Nota di contenuto	Wavelet Neural Networks; Contents; Preface; 1 Machine Learning and Financial Engineering; Financial Engineering; Financial Engineering and Related Research Areas; Functions of Financial Engineering; Applications of Machine Learning in Finance; From Neural to Wavelet Networks; Wavelet Analysis; Extending the Fourier Transform: The Wavelet Analysis Paradigm; Neural Networks; Wavelet Neural Networks; Applications of Wavelet Neural Networks in Financial Engineering, Chaos, and Classification; Building Wavelet Networks; Variable Selection; Model Selection; Model Adequacy Testing; Book Outline References2 Neural Networks; Parallel Processing; Processing Units; Activation Status and Activation Rules; Connectivity Model; Perceptron; The Approximation Theorem; The Delta Rule; Backpropagation Neural Networks; Multilayer Feedforward Networks; The Generalized Delta Rule; Backpropagation in practice; Training with Backpropagation; Network Paralysis; Local Minima; Nonunique Solutions; Configuration Reference; Conclusions; References; 3 Wavelet Neural Networks; Wavelet Neural Networks for Multivariate Process Modeling; Structure of a Wavelet Neural Network

Initialization of the Parameters of the Wavelet NetworkTraining a Wavelet Network with Backpropagation; Stopping Conditions for Training; Evaluating the Initialization Methods; Conclusions; References; 4 Model Selection: Selecting the Architecture of the Network; The Usual Practice; Early Stopping; Regularization; Pruning; Minimum Prediction Risk; Estimating the Prediction Risk Using Information Criteria; Estimating the Prediction Risk Using Sampling Techniques; Bootstrapping; Cross-Validation; Model Selection Without Training; Evaluating the Model Selection Algorithm

Case 1: Sinusoid and Noise with Decreasing VarianceCase 2: Sum of Sinusoids and Cauchy Noise; Adaptive Networks and Online synthesis; Conclusions; References; 5 Variable Selection: Determining the Explanatory Variables; Existing Algorithms; Sensitivity Criteria; Model Fitness Criteria; Algorithm for Selecting the Significant Variables; Resampling Methods for the Estimation of Empirical Distributions; Evaluating the Variable Significance Criteria; Case 1: Sinusoid and Noise with Decreasing Variance; Case 2: Sum of Sinusoids and Cauchy Noise; Conclusions; References

6 Model Adequacy: Determining a Networks Future PerformanceTesting the residuals; Testing for Serial Correlation in the Residuals; Evaluation criteria for the prediction ability of the wavelet network; Measuring the Accuracy of the Predictions; Scatter Plots; Linear Regression Between Forecasts and Targets; Measuring the Ability to Predict the Change in Direction; Two simulated Cases; Case 1: Sinusoid and Noise with Decreasing Variance; Case 2: Sum of Sinusoids and Cauchy Noise; Classification; Assumptions and Objectives of Discriminant Analysis; Validation of the Discriminant Function

Evaluating the Classification Ability of a Wavelet Network

Sommario/riassunto

Through extensive examples and case studies, Wavelet Neural Networks provides a step-by-step introduction to modeling, training, and forecasting using wavelet networks. The acclaimed authors present a statistical model identification framework to successfully apply wavelet networks in various applications, specifically, providing the mathematical and statistical framework needed for model selection, variable selection, wavelet network construction, initialization, training, forecasting and prediction, confidence intervals, prediction intervals, and model adequacy testing. The text is id