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# Fuzzy Regression Matlab Code

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Optimal Models and Methods with Fuzzy Quantities  
Statistics With Matlab  
Implementation of Neutrosophic F-unction Memberships Using MATLAB Program  
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### **Fuzzy Logic** Springer Nature

The key idea of this book is that hinging hyperplanes, neural networks and support vector machines can be transformed into fuzzy models, and interpretability of the resulting rule-based systems can be ensured by special model reduction and visualization techniques. The first part of the book deals with the identification of hinging hyperplane-based regression trees. The next part deals with the validation, visualization and structural reduction of neural networks based on the transformation of the hidden layer of the network into an additive fuzzy rule base system. Finally, based on the analogy of support vector regression and fuzzy models, a three-step model reduction algorithm is proposed to get interpretable fuzzy regression models on the basis of support vector regression. The authors demonstrate real-world use of the algorithms with examples taken from process engineering, and they support the text with downloadable Matlab code. The book is suitable for researchers, graduate students and practitioners in the areas of computational intelligence and machine learning.

### **Optimal Models and Methods with Fuzzy Quantities** Pws Publishing Company

Monte Carlo Methods in Fuzzy Optimization is a clear and didactic book about Monte Carlo methods using random fuzzy numbers to obtain approximate solutions to fuzzy optimization problems. The book includes various solved problems such as fuzzy linear programming, fuzzy regression, fuzzy inventory control, fuzzy game theory, and fuzzy queuing theory. The book will appeal to engineers, researchers, and students in Fuzziness and applied mathematics.

### **Statistics With Matlab** BoD – Books on Demand

Dive into intelligent systems, machine learning, and control with this hands-on, project-based textbook, including over 20 hands-on Arduino, Matlab and Simulink assignments. With over 120 end-of-chapter problems, and solutions for instructors, this is the ideal practical introduction for senior and graduate engineering students.

### **Implementation of Neutrosophic Function Memberships Using MATLAB Program**

Springer

This book provides a broad-ranging, but detailed overview of the basics of Fuzzy Logic. The fundamentals of Fuzzy Logic are discussed in detail, and illustrated with various solved examples. The book also deals with applications of Fuzzy Logic, to help readers more fully understand the concepts involved. Solutions to the problems are programmed using MATLAB 6.0, with simulated results. The MATLAB Fuzzy Logic toolbox is provided for easy reference.

### **Data Analysis with MATLAB** Createspace Independent Publishing Platform

This book develops the Regression techniques: Linear Regression Model, Learner techniques (linear regression models, regression trees, Gaussian process regression models, Support Vector Machines, and ensembles of regression trees), Neural Networks Regression, Generalized Linear Models (GLM)

and Nonlinear Regression. The most important content is the following: - Parametric Regression Analysis - Linear Regression - Fit Model to Data - Examine Quality and Adjust the Fitted Model - Predict or Simulate Responses to New Data - Share Fitted Models - Linear Regression Workflow - Linear Regression with Interaction Effects - Interpret Linear Regression Results - Cook's Distance - Coefficient Standard Errors and Confidence Intervals - Coefficient Covariance and Standard Errors - Coefficient Confidence Intervals - Coefficient of Determination (R-Squared) - Durbin-Watson Test - F-statistic - Assess Fit of Model Using F-statistic - t-statistic - Assess Significance of Regression Coefficients Using t-statistic - Hat Matrix and Leverage - Residuals - Assess Model Assumptions Using Residuals - Summary of Output and Diagnostic Statistics - Train Regression Models in Regression Learner App - Automated Regression Model Training - Manual Regression Model Training - Parallel Regression Model Training - Compare and Improve Regression Models - Select Data and Validation for Regression Problem - Linear Regression Models - Regression Trees - Support Vector Machines - Gaussian Process Regression Models - Ensembles of Trees - Feature Selection - Feature Transformation - Assess Model Performance - Check Performance in History List - Evaluate Model Using Residuals Plot - Export Regression Model to Predict New Data - Train Regression Trees Using Regression Learner App - Mathematical Formulation of SVM Regression - Solving the SVM Regression Optimization Problem - Fit Regression Models with a Neural Network - Multinomial Models for Nominal Responses - Multinomial Models for Ordinal Responses - Hierarchical Multinomial Models - Generalized Linear Models - Lasso Regularization of Generalized Linear Models - Regularize Poisson Regression - Regularize Logistic Regression - Regularize Wide Data in Parallel - Generalized Linear Mixed-Effects Models - Fit a Generalized Linear Mixed-Effects Model - Regression with Neural Networks - Nonlinear Regression - Fit Nonlinear Model to Data - Examine Quality and Adjust the Fitted Nonlinear Model - Predict or Simulate Responses Using a Nonlinear Model - Mixed-Effects Models

### *Linear and Nonlinear Regression With Matlab. Fitting Curves and Surfaces to Data* Physica

In real-life situation, complexity occurs when the system is not understandable. The size, shape, position, or color of a system can cause a phenomenon. These complexities are classified in fuzzy sets. The fuzzy sets role is significant when applied to complex phenomena, which is not easily described by traditional mathematics. Fuzzy regression may be more appropriate tool than the traditional regression analysis. In fuzzy regression, it is assumed that the system's structure is ambiguous or complex. A brief review of the linear programming models in fuzzy linear regression is given. Symmetric, asymmetric, trapezoidal and bell shaped membership functions are investigated. In addition, the different linear programming models are summarized, and a new model is presented for better results. Moreover, the new model is compared with other two models that are Tanaka and Hojati models.

### Fuzzy Linear Regression Sebtel Press

This paper proposes an a-level estimation algorithm for ridge fuzzy regression modeling, addressing the multicollinearity phenomenon in the fuzzy linear regression setting.

Monte Carlo Methods in Fuzzy Optimization Createspace Independent Publishing Platform  
Hybrid Intelligent Techniques for Pattern Analysis and Understanding outlines the latest research on the development and application of synergistic approaches to pattern analysis in real-world scenarios. An invaluable resource for lecturers, researchers, and graduates students in computer science and engineering, this book covers a diverse range of hybrid intelligent techniques, including image segmentation, character recognition, human behavioral analysis, hyperspectral data processing, and medical image analysis.

Introduction to Fuzzy Logic using MATLAB PWS Publishing Company

This book presents the most commonly used techniques for the most statistical inferences based on fuzzy data. It brings together many of the main ideas used in statistical inferences in one place, based on fuzzy information including fuzzy data. This book covers a much wider range of topics than a typical introductory text on fuzzy statistics. It includes common topics like elementary probability, descriptive statistics, hypothesis tests, one-way ANOVA, control-charts, reliability systems and regression models. The reader is assumed to know calculus and a little fuzzy set theory. The conventional knowledge of probability and statistics is required. Key Features: Includes example in Mathematica and MATLAB. Contains theoretical and applied exercises for each section. Presents various popular methods for analyzing fuzzy data. The book is suitable for students and researchers in statistics, social science, engineering, and economics, and it can be used at graduate and P.h.D level.

Regression Models with MATLAB Springer Science & Business Media

Membership function (MF) plays a key role for getting an output of a system and hence it influences system's performance directly. Therefore choosing a MF is an essential task in fuzzy logic and neutrosophic logic as well. Uncertainty is usually represented by MFs. In this paper, a novel Matlab code is derived for trapezoidal neutrosophic function and the validity of the proposed code is proved with illustrative graphical representation.

Ridge Fuzzy Regression Modelling for Solving Multicollinearity CRC Press

MATLAB has the tools to work with large datasets and apply the necessary data analysis techniques. This book develops the work with parametric regression analysis techniques. Big data analytics examines large amounts of data to uncover hidden patterns, correlations and other insights. With today's technology, it's possible to analyze your data and get answers from it almost immediately - an effort that's slower and less efficient with more traditional business intelligence solutions.

Regression models describe the relationship between a response (output) variable, and one or more predictor (input) variables. Statistics and Machine Learning Toolbox allows you to fit linear, generalized linear, and nonlinear regression models, including stepwise models and mixed-effects models. Once you fit a model, you can use it to predict or simulate responses, assess the model fit using hypothesis tests, or use plots to visualize diagnostics, residuals, and interaction effects. Statistics and Machine Learning Toolbox also provides nonparametric regression methods to accommodate more complex regression curves without specifying the relationship between the response and the predictors with a predetermined regression function. You can predict responses for new data using the trained model. Gaussian process regression models also enable you to compute prediction intervals.

Fuzzy Regression Analysis Chapman and Hall/CRC

"Aims to present both conventional and fuzzy regression analyses from theoretical aspects followed by application examples. The present book contains chapters originating from different scientific fields. The first deals with both crisp (conventional) linear or nonlinear regression and fuzzy linear or nonlinear regression. The application example refers to the relationship between sediment transport rates on the one hand and stream discharge and rainfall intensity on the other hand. Second chapter refers to the crisp linear or nonlinear regression of six heavy metals between different soft tissues and shells of *Telescopium telescopium* and its habitat surface sediments. Third describes the crisp linear, multiple linear, nonlinear and Gaussian process regressions. The fourth is confronted with a classic regression model, named Geographically Weighted Regression (GWR), which constitutes a spatial statistics method. The fifth chapter regards fuzzy linear regression based on symmetric triangular fuzzy numbers. The sixth chapter treats fuzzy linear regression based on trapezoidal membership functions. The main application of this chapter concerns the dependence of rainfall records between neighboring rainfall stations for a small sample of data. The next chapter refers to the multivariable crisp and fuzzy linear regression. The eighth chapter deals with the fuzzy linear regression, with crisp input data and fuzzy output data. All the chapters offer a proper foundation of either widely used or new techniques upon regression. Among the new techniques, several innovated fuzzy regression based methodologies are developed for real problems, and useful conclusions are drawn"--

Fuzzy Systems Toolbox for Use with MATLAB Infinite Study

The third international conference on Information Systems Design and Intelligent Applications (INDIA - 2016) held in Visakhapatnam, India during January 8-9, 2016. The book covers all aspects of information system design, computer science and technology, general sciences, and educational research. Upon a double blind review process, a number of high quality papers are selected and collected in the book, which is composed of three different volumes, and covers a variety of topics, including natural language processing, artificial intelligence, security and privacy, communications, wireless and sensor networks, microelectronics, circuit and systems, machine learning, soft computing, mobile computing and applications, cloud computing, software engineering, graphics and image processing, rural engineering, e-commerce, e-governance, business computing, molecular computing, nano-computing, chemical computing, intelligent computing for GIS and remote sensing, bio-informatics and bio-computing. These fields are not only limited to computer researchers but also include mathematics, chemistry, biology, bio-chemistry, engineering, statistics, and all others in which computer techniques may assist.

**Fuzzy Relational Calculus: Theory, Applications And Software (With Cd-rom)** Createspace Independent Publishing Platform

Fuzzy Logic is becoming an essential method of solving problems in all domains. It gives tremendous impact on the design of autonomous intelligent systems. The purpose of this book is to introduce Hybrid Algorithms, Techniques, and Implementations of Fuzzy Logic. The book consists of thirteen chapters highlighting models and principles of fuzzy logic and issues on its techniques and implementations. The intended readers of this book are engineers, researchers, and graduate students interested in fuzzy logic systems.

**Big Data Analytics With Matlab** CRC Press

Monte Carlo Methods in Fuzzy Optimization is a clear and didactic book about Monte Carlo methods using random fuzzy numbers to obtain approximate solutions to fuzzy optimization problems. The book includes various solved problems such as fuzzy linear programming, fuzzy regression, fuzzy inventory control, fuzzy game theory, and fuzzy queuing theory. The book will appeal to engineers, researchers, and students in Fuzziness and applied mathematics.

**Interpretability of Computational Intelligence-Based Regression Models** John Wiley & Sons  
Regression is the process of fitting models to data. The regression process depends on the model. If a model is parametric, regression estimates the parameters from the data. If a model is linear in the parameters, estimation is based on methods from linear algebra that minimize the norm of a residual vector. If a model is nonlinear in the parameters, estimation is based on search methods from optimization that minimize the norm of a residual vector. This book delves especially in the following regression models: "Parametric Regression Analysis" "Linear Regression" "Regression Using Dataset Arrays" "Linear Regression with Interaction Effects" "Stepwise Regression" "Robust Regression" "Ridge Regression" "Lasso and Elastic Net" "Partial Least Squares" on page 9-137 "Generalized Linear Models" "Lasso Regularization of Generalized Linear Models" "Nonlinear Regression" "Mixed-Effects Models" "Pitfalls in Fitting Nonlinear Models by Transforming to Linearity" "Survival Analysis?" "Kaplan-Meier Method" "Hazard and Survivor Functions for Different Groups" "Cox Proportional Hazards Regression" "Cox Proportional Hazards Model for Censored Data"

**Fuzzy Systems Toolbox for Use with MATLAB** World Scientific

This book examines fuzzy relational calculus theory with applications in various engineering subjects. The scope of the text covers unified and exact methods with algorithms for direct and inverse problem resolution in fuzzy relational calculus. Extensive engineering applications of fuzzy relation compositions and fuzzy linear systems (linear, relational and intuitionistic) are discussed. Some examples of such applications include solutions of equivalence, reduction and minimization problems in fuzzy machines, pattern recognition in fuzzy languages, optimization and inference engines in textile and chemical engineering, etc. A comprehensive overview of the authors' original work in fuzzy relational calculus is also provided in each chapter. The attached CD-Rom contains a toolbox with many functions for fuzzy calculations, together with an original algorithm for inverse problem resolution in MATLAB. This book is also suitable for use as a textbook in related courses at advanced undergraduate and graduate levels.

*Conventional and Fuzzy Regression* Springer

This edited book is based on the best papers accepted for presentation during the 2nd Springer Conference of the Arabian Journal of Geosciences (CAJG-2), Tunisia, in 2019. It is of interest to all researchers practicing geophysics/seismology, structural, and petroleum geology. With four sections spanning a large spectrum of geological and geophysical topics with particular reference to Middle East, Mediterranean region, and Africa, this book presents a series of research methods that are nowadays in use for measuring, quantifying, and analyzing several geological domains. It starts with a subsection dedicated to the latest research studies on seismic hazard and risk assessment in Africa presented during the 2019 IGCP-659 meeting organized alongside the CAJG-2. And, it includes new research studies on earthquake geodesy, seismotectonics, archeoseismology and active

faulting, well logging methods, geodesy and exploration/theoretical geophysics, petroleum geochemistry, petroleum engineering, structural geology, basement architecture and potential data, tectonics and geodynamics, and thermicity, petroleum, and other georesources. The edited book gives insights into the fundamental questions that address the genesis and evolution of our planet, and this is based on data collection and experimental investigations under physical constitutive laws. These multidisciplinary approaches combined with the geodynamics of tectonic provinces and investigations of potential zones of natural resources (petroleum reservoirs) provide the basis for a more sustainability in the economic development.

**Monte Carlo Methods in Fuzzy Optimization** Cambridge University Press

The contents of this book is focused on basic data analysis with MATLAB. Initially the import and export of data, key tasks in any kind of analysis is studied. Then numerical and graphical data exploratory analysis is presented. The next block of content is focused on descriptive statistics and correlation analysis, covariance and regression. These topics are expanded to the study of model simple and multiple linear regression and Curve Fitting. Polynomial regression and nonlinear regression is also studied. Finally an important piece of content is devoted to the time series analysis in interactive mode and command mode. The following topics are developed: Importing and Exporting Data Plotting Data Missing Data Inconsistent Data Filtering Data Filter Function Moving Average Filter Discrete Filter Detrending Data Removing Linear Trends from Data Differencing Data Descriptive Statistics Functions for Calculating Descriptive Statistics Interactive Data Exploration Interacting with MATLAB Data Graphs Marking Up Graphs with Data Brushing Effects of Brushing on Data Making Graphs Responsive with Data Linking How to Link Plots How Linked Plots Behave Linking vs. Refreshing Plots Using Linked Plot Controls Interacting with Graphed Data Data Brushing with the Variables Editor Using Data Tips to Explore Graphs Regression Analysis Linear Correlation Covariance Correlation Coefficients Linear Regression Residuals and Goodness of Fit Fitting Data with Curve Fitting Toolbox Functions Interactive Fitting The Basic Fitting GUI Preparing for Basic Fitting Opening the Basic Fitting GUI Programmatic Fitting MATLAB Functions for Polynomial Models Linear Model with Nonpolynomial Terms Multiple Regression Time Series Analysis Time Series Objects Time Series Data Sample Time Series Objects and Methods Time Series Constructor Time Series Collection Constructor Time Series Tools Importing and Exporting Data Plotting Time Series Selecting Data for Analysis Editing Data, Time, Attributes, and Events Processing and Manipulating Time Series

Hybrid Intelligent Techniques for Pattern Analysis and Understanding Springer

Regression analysis is a relatively simple yet extremely useful and widely employed tool for determining relationship between some variables on the basis of some observed values taken by these variables. Fuzzy regression analysis has been recently devised to accommodate in the framework of regression analysis vaguely specified data which are omnipresent in many applications, notably in all areas where human judgements are used. Fuzzy sets theory provides here proper tools. This book is a collection of papers written by virtually all major contributors to fuzzy regression. Its main issue is that vague, imprecise, etc. data may now be used in regression analysis. This is new. Apart from this it gives an extensive coverage of the whole field of fuzzy regression, both in a strictly mathematical and applicational perspective. Most approaches are

algorithmic, and can be readily implemented. Information on software is provided.