

Marshall University

College of Science

Mathematics Department

MTH 412/512: Regression Analysis

Course catalog description

Topics in determining regression models; deriving parameter estimates using calculus; detailed coverage of tests of assumptions and remedial procedures (transformations and weighted least squares); multiple and polynomial regression; tests and corrections for autocorrelation.

Credit hours

3 hours

Prerequisites

For MTH 412: A grade of C or higher in a previous statistics course

List of topics

- An introduction to regression. Motivating examples, an overview of the objectives of regression analysis.
- Simple Linear Regression. (Most of Chapters 1 - 4: Explicit readings assigned as we move through the material)
- The regression model (1.1-1.5)
- Estimation of the regression coefficients and error variance (1.6-1.8).
- Inferences for the regression coefficients. (2.1-2.3, 4.1)
- Estimating the expected response at a particular x ; one-at-a-time and simultaneous confidence intervals.(2.4, 2.6, 4.2)
- Predicting future observations. (2.5,4.3)
- The Analysis of Variance approach to regression and general linear tests (2.7, 2.8))
- Assessing model assumptions and a first look at remedial measures. (Parts of Chapter 3)

- An introduction to multiple linear regression models (section 6.1, description of models in 8.1 and 8.2)
- Regression models in matrix form.(Section 5.1-5.4, the definition of an inverse in 5.6, 5.8- 5.9, 6.2)
- Multiple Linear Regression (5.10-5.13, much of Chapters 6, 7 and 8)
 - Estimation of the regression coefficients and error variance.
 - Inferences for the regression coefficients.
 - Estimating the expected response at a particular x ; one-at-a-time and simultaneous confidence intervals.
 - Predicting future observations.
 - The Analysis of Variance approach to regression and general linear F-tests
- More on diagnostics and tests for assessing model assumptions with some on measures to accommodate violations of usual assumptions. (Parts of Chapters 10 and 11)
- Model building/variable selection (Ch. 8)
- An introduction to nonlinear regression models. (Parts of Chapters 13 and 14)

Suggested textbooks

- *Applied Linear Statistical Models*, Fifth edition, J. Neter, J. et al. McGraw-Hill/Irwin. ISBN: 978-0-256-11736-3

Last updated

December 2016