Math 540 - Regression Analysis

Simple linear regression, geometry and algebra of least squares, residuals
Confidence interval and significance test for the slope and intercept, prediction intervals
Multiple linear regression model, the $F$-test and $t$-tests of coefficients, interpretation of standard errors, interpretation of $R^2$ and adjusted $R^2$, standardized and studentized residuals
General linear model in matrix form, normal equations
Diagnostics: analysis of residuals, normal probability plots, leverage, outliers and influential cases (Cook's distance, DFITS), multicollinearity (variance inflation factor), autocorrelation (Durban-Watson test), nonlinearity and transformations, curvature and interaction (lack of fit test)
Model building: criteria for variable selection (cross validation, Mallows' Cp), best subsets regression, forward, backward and stepwise regression
Indicator (dummy) variables
Nonlinear regression: Logistic regression

Recommended Textbooks


