**Title**: Comparative Analysis of Statistical Methods for Predicting Body Fat Percentage Using Brozek’s Formula

**Abstract**:

The report investigates various linear regression methods to predict body fat percentage using Brozek’s formula, assessing models like linear regression, ridge regression, LASSO, PCR, and PLS. The data is split into training and testing sets, and model performance is evaluated using mean squared error and Monte Carlo Cross-Validation.

**Introduction**:

The study focuses on the rising global prevalence of obesity and the need for accurate body fat measurement. It aims to compare different statistical models to find the best predictors among seventeen physiological measurements.

**Methodology**:

Data was split 70/30 between training and testing sets. Models tested include traditional linear regression, subset selection, AIC-based selection, ridge regression, LASSO, PCR, and PLS.

**Results and Findings:**

Models were compared based on mean squared error. LASSO was particularly effective, improving handling of multicollinearity. The report lists significant predictors identified by each model, illustrating different methodologies and assumptions.

**Future Research:**

Suggests integrating more predictors like diet and lifestyle, and exploring advanced machine learning techniques to enhance model accuracy.

**Further Reading:**

References include CRAN documentation for statistical packages and a Wikipedia article on body fat percentage.

This condensed summary highlights the core elements of the study, including the methodologies, key findings, and suggestions for further research.