Multiple Linear Regression extends bivariate linear regression by incorporating multiple independent variables (predictors). \( \hat{Y} = \hat{\beta}_0 + \hat{\beta}_1X + \hat{\epsilon} \) (The simple linear model with 1 predictor). \( \hat{Y} = \hat{\beta}_0 + \hat{\beta}_1X + \hat{\beta}_2X_2 + \hat{\epsilon} \). When adding more than 2 predictors, the model is expressed as: \( \hat{Y} = \hat{\beta}_0 + \hat{\beta}_1X_1 + \hat{\beta}_2X_2 + \hat{\epsilon} \). In model building, a residual is what is left after the model is fit. It is the difference between the observed values and the values predicted by the model. © Dr. Maher Khelifa. Assumptions. 30. The assumptions for the Multiple Linear Regression are the same as for the Simple Linear Regression model (see slides 15-17). Multiple regression in behavioral research, third edition. New York: Harcourt. Brace College Publishers. Los Angeles: SAGE, 2017. 817 p. Linear models, their variants, and extensions are among the most useful and widely used statistical tools for social general research. This book aims to provide an accessible, in-depth, modern treatment of regression analysis, linear models, generalized linear models, and closely related methods. The book should be of interest to students and researchers in the social sciences. Although the specific choice of methods and examples reflects this readership.