BetterReg: An R package for Useful Regression Statistics

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Software

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Summary

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Statistics such as squared semi partial correlation, tolerance, and Mahalanobis Distances are useful for reporting the results of OLS Regression (e.g., Tabachnick et al., 2019). Similarly, values such as the Likelihood Ratio χ^2 (e.g. Cohen et al., 2015) and Likelihood R^2 (Menard, 2010).

Squared semipartial correlations sr^2 provide a measure of uniquely explained variances that is on the same scale as R^2 values. Tolerance values address multicollinearity by addressing variance unexplained in a predictor. Mahalanobis Distances are a popular measure of multivariate outliers that are presented on an χ^2 scale. The Likelihood Ratio χ^2 provides a significance test that is more stable than the commonly presented Wald Test for logistic regression. The Likelihood Ratio χ^2 is the most widely recommended Pseudo R^2 statistic for logistic.

Statement of Need

The statistics provided in this package are not part of base R (R Core Team, 2021) or popular packages such as `car` (Fox & Weisberg, 2019). To fill these gaps, I developed BetterReg to provide these values.

Usage

BetterReg functions require existing regression models (either OLS or Logistic for most statistics), dataset names (for some approaches), number of predictors (some functions), and desired amount of output (Maha1 function).

part function for squared semipartial correlations

The part function requires an existing LM model and indication of number of predictors.

```
library(BetterReg)
mymodel<-lm(y~x1+x2+x3+x4+x5, data=testreg)
parts(model=mymodel, pred=5)

## Predictor 1: semi partial = 0.032; squared semipartial = 0.001
## Predictor 2: semi partial = 0.307; squared semipartial = 0.094
```

```

33
34 ## Predictor 3: semi partial = 0.268; squared semipartial = 0.072
35
36 ## Predictor 4: semi partial = 0.134; squared semipartial = 0.018
37
38 ## Predictor 5: semi partial = 0.241; squared semipartial = 0.058

```

39 tolerance function for multicollinearity assumptions

40 The tolerance function requires only a model.

```

41 mymodel<-lm(y~x1+x2+x3+x4+x5, data=testreg)
42 tolerance(model=mymodel)
43
44 ##           x1           x2           x3           x4           x5
45 ## 0.9976977 0.9990479 0.9931082 0.9953317 0.9980628

```

46 Mahal function for detecting multivariate outliers

47 The Mahal function requires model, predictors, and desired number of values to output.

```

48 mymodel<-lm(y~x1+x2+x3+x4+x5, data=testreg)
49 Mahal(model=mymodel, pred=5, values=10)
50
51 ##           537           770           342           760           299           982           446           174
52 ## 14.56342 15.03188 15.56224 15.60986 16.52869 16.80958 17.38597 18.11072
53 ##           458           530
54 ## 20.02762 25.09934

```

55 LRchi function for Logistic Regression Coefficients

56 The LRchi function takes input for the dependent variable name (y), up to 10 predictors (x1, x2, etc.), and the number of predictors.

```

57
58 LRchi(data=testlog, y="dv", x1="iv1", x2="iv2", numpred=2)
59
60 ## Predictor: iv1; LR squared 34.09, p= 0
61
62 ## Predictor: iv2; LR squared 0.19, p= 0.67

```

63 Pseudo function for Logistic Regression Effect Size

64 The Psuedo function takes an existing model as input

```

65 mymodel<-glm(dv~iv1+iv2+iv3+iv4, testlog,family = binomial())
66 pseudo(model=mymodel)
67
68 ## Likelihood Ratio R-squared (McFadden, Recommended) = 0.26
69
70 ## Cox-Snell R-squared) = 0.301
71
72 ## Nagelkerk R-squared = 0.402

```

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