Comparing two models using anova() function in R

From the documentation for anova():

When given a sequence of objects, 'anova' tests the models against one another in the order specified...

What does it mean to test the models against one another? And why does the order matter?

Here is an example from the GenABEL tutorial:

```
> modelAdd = lm(qt-as.numeric(snp1))
> modelDom = lm(qt-I(as.numeric(snp1)>=2))
> modelRec = lm(qt-I(as.numeric(snp1)>=3))
anova(modelAdd, modelGen, test="Chisq")
Analysis of Variance Table
\label{eq:model_section} \begin{array}{lll} \textbf{Model 1: } qt \sim \textbf{as}. \texttt{numeric(snp1)} \\ \textbf{Model 2: } qt \sim \texttt{snp1} \\ \textbf{Res.Df} & \texttt{RSS} & \textbf{Df} & \textbf{Sum of Sq Pr(>Chi)} \end{array}
1 2372 2320
        2371 2320 1
                                   0.0489
anova(modelDom, modelGen, test="Chisq")
Analysis of Variance Table
Model 1: qt ~ I(as.numeric(snp1) >= 2)
Model 2: qt ~ snp1
  Res.Df RSS Df Sum of Sq Pr(>Chi)
1 2372 2322
2 2371 2320 1
                                         1.77
                                                            0.18
  anova(modelRec, modelGen, test="Chisq")
Analysis of Variance Table
Model 1: qt ~ I(as.numeric(snp1) >= 3)
Model 2: qt ~ snp1
  Res.Df RSS Df Sum of Sq Pr(>Chi)
       2372 2324
1 2372 2324
2 2371 2320 1
                                        3.53 0.057 .
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

How do I interpret this output?

r anova



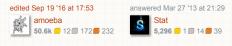


1 Answer

When you use anova(lm.1,lm.2,test="chisq"), it performs the Chi-square test to compare lm.1 and lm.2 (i.e. it tests whether reduction in the residual sum of squares are statistically significant or not). Note that this makes sense only if lm.1 and lm.2 are nested models.

For example, in the 1st anova that you used, the p-value of the test is 0.82. It means that the fitted model "modelAdd" is not significantly different from modelGen at the level of $\alpha=0.05$. However, using the p-value in the 3rd anova, the model "modelRec" is significantly different form model "modelGen" at $\alpha=0.1$.

Check out ANOVA for Linear Model Fits as well.



- But does that imply anything about whether one of the two is better? Thanks! qed Mar 29 '13 at 17:22
- It depends on how you define the term "better". If you define it as the model that provides less residual sum of squares, then the answer is yes. This is because, this test compares the reduction in the residual sum of squares. Stat Mar 29 13 at 21:32
- On the other hand, if the two models are not significantly different, could one argue that the simpler model is "better"? I am thinking about parcimony here. Sininho May 31 '16 at 15:00

what if the anova(mod1, mod2, test = "LRT") what's the difference does this make? - ElleryL Aug 13 '17 at 21:36

protected by amoeba Sep 19 '16 at 17:45

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