[R] How to test combined effects?

On Nov 2, 2007, at 12:20PM , Gang Chen wrote:

> *Thanks a lot for the help!*
>
>
>> *First, if you would like to performa an overall test of whe*
>> *the IQ interactions are necessary, you may find it most use*
>> *use anova to compare a full and reduced model. Something l*
>>
>> *ModelFit.full <-lme(mct~ IQ*age+IQ*I(age^2)+IQ*I(age^3*
>> *random=~1|ID)*
>> *ModelFit.reduced <-lme(mct~ IQ + age+I(age^2)+I(age^3)*
>> *random=~1|ID)*
>> *anova(ModelFit.full, ModelFit.reduced, test="F")*
>
>
> *I had done this before, but it seems that I would only get a*
> *likelihood ratio test, not a partial F test, out of the anov*
> *'test' option with logical value in anova seems to take TRUE*
> *FALSE, thus either I get a likelihood ration test or not. I*
> *likelihood ratio test with ML method is legitimate in this c*

I'll have to defer to others on the validity of the LR test in context, as I've got my programmer hat on today and not my sta theory hat ... ;-)

>
>
>> *Second, you don't have the syntax right for estimable(). A*
>> *described and shown by example in the manual page. The cor*
>> *syntax is:*
>>
>> *library(gmodels)*

>> estimable(ModelFit, c('IQ:age'=1, 'IQ:I(age^2)'= 1, 'I
>> = 1))
>>
>> Note the pattern of quoted name, followed by '=', and then
>> value 1 (not zero). This will perform a single joint test
>> these three coefficients are zero.
>
>
> Thanks for catching the errors! Yes this works. However it g
> t test with 1 degree of freedom, not exactly a partial F tes
> does it mean that this only tests the average effect of thos
> terms? If so, that would be slightly different from the part
> test I was looking for, no?

Yes, this provides a 1-degree of freedom contrast between an individual with ('IQ:age'=0, 'IQ:I(age^2)'=0, 'IQ:I(age^3)'=0) another with ('IQ:age'=1, 'IQ:I(age^2)'=1, 'IQ:I(age^3)'=1).

Although we do provide a joint Wald test for 'lm', 'glm', 'aov 'gee' or 'geese' objects, we have not done so for 'lme' object The code to do so is straightforward, and I'll send you a copy privately.

Perhaps someone who has the stat theory hat on today can comm the validity of the Wald X^2 here, and on the relative merits LR test vs the Wald test for fixed effects of an LME.

In any case here is how you use the enhanced code.

```
        > library(nlme)
        > library(gmodels)
        > Orthodont$Rand <- rnorm(nrow(Orthodont))  # add a nc
        > fm2 <- lme(distance ~ age * Rand + Sex * Rand, data
random = ~ 1)
        > cmat <- cbind( "Rand"=c(1,0,0),   "age:Rand"=c(0,1,0
"Rand:SexFemale"=c(0,0,1) )
        > cmat
```

```
             Rand age:Rand Rand:SexFemale
        [1,]    1        0              0
        [2,]    0        1              0
        [3,]    0        0              1
        > estimable( fm2, cmat, joint.test=FALSE )  # individu
                        Estimate Std. Error    t value DF  Pr
        (0 0 1 0 0 0)  0.39919525  0.9263579  0.4309298 77 0.6
        (0 0 0 0 1 0) -0.07152143  0.0783120 -0.9132883 77 0.3
        (0 0 0 0 0 1)  0.47758669  0.2993967  1.5951635 77 0.1
        > attach(environment(estimable)) # make the estimable
available to local code

               The following object(s) are masked from packag

                CrossTable ci ci.binom coefFrame estimable fa
fit.contrast glh.test make.contrasts print.glh.test summary.gl

        > source("~/src/r-gregmisc/gmodels/R/estimable.R") # l
modified code
        > estimable( fm2, cmat, joint.test=TRUE ) # joint Walc
           X2.stat DF Pr(>|X^2|)
        1 4.876038  3  0.1811025
        > q()

-Greg


> Gang
>
>
>> -G
>>
>>
>>
>> On Oct 30, 2007, at 5:26PM , Gang Chen wrote:
>>
>>> Dieter,
>>>
```

```
>>> Thank you very much for the help!
>>>
>>> I tried both glht() in multcomp and estimable() in gmodels
>>> couldn't get them work as shown below. Basically I have tr
>>> specifying those continuous variables. Any suggestions?
>>>
>>> Also it seems both glht() and estimable() would give multi
>>> tests. Is there a way to obtain sort of partial F test?
>>>
>>>
>>>> ModelFit<-lme(mct~ IQ*age+IQ*I(age^2)+IQ*I(age^3), MyData
>>> random=~1|ID)
>>>> anova(ModelFit)
>>>
>>>                 mDF denDF  F-value p-value
>>> (Intercept)     1   257 54393.04  <.0001
>>> IQ              1   215     3.02  0.0839
>>> age             1   257    46.06  <.0001
>>> I(age^2)        1   257     8.80  0.0033
>>> I(age^3)        1   257    21.30  <.0001
>>> IQ:age          1   257     1.18  0.2776
>>> IQ:I(age^2)     1   257     0.50  0.4798
>>> IQ:I(age^3)     1   257     0.23  0.6284
>>>
>>>> library(multcomp)
>>>> glht(ModelFit, linfct = c("IQ:age = 0", "IQ:I(age^2) = 0"
>>> (age^3) = 0"))
>>> Error in coefs(ex[[3]]) :
>>>    cannot interpret expression 'I''age^2' as linear functi
>>>
>>>> library(gmodels)
>>>> estimable(ModelFit, rbind('IQ:age'=0, 'IQ:I(age^2) = 0',
>>> (age^3) = 0'))
>>> Error in FUN(newX[, i], ...) :
>>>    `param' has no names and does not match number of coefi
>>> model. Unable to construct coefficient vector
>>>
>>> Thanks,
```

>>> Gang
>>>
>>>
>>> On Oct 30, 2007, at 9:08 AM, Dieter Menne wrote:
>>>
>>>
>>>> Gang Chen <gangchen <at> mail.nih.gov> writes:
>>>>
>>>>
>>>>>
>>>>> Suppose I have a mixed-effects model where yij is the ji
>>>>> sample for
>>>>> the ith subject:
>>>>>
>>>>> yij= beta0 + beta1(age) + beta2(age^2) + beta3(age^3) +
>>>>> (IQ) +
>>>>> beta5(IQ^2) + beta6(age*IQ) + beta7(age^2*IQ) + beta8
>>>>> *IQ)
>>>>> +random intercepti + eij
>>>>>
>>>>> In R how can I get an F test against the null hypothesis
>>>>> beta6=beta7=beta8=0? In SAS I can run something like cor
>>>>> age*IQ
>>>>> 1, age^2*IQ 1, age^3 *IQ 1, but is there anything simila
>>>>>
>>>>
>>>> Check packages multcomp and gmodels for contrast tests th
>>>> with lme.
>>>>
>>>> Dieter
>>>>
>>>
>>> _____
>>> R-help at r-project.org mailing list
>>> https://stat.ethz.ch/mailman/listinfo/r-help
>>> PLEASE do read the posting guide http://www.R-project.org/
>>> guide.html
>>> and provide commented, minimal, self-contained, reproducib

>>

>