

# solution to the warning message using glmer

Asked 6 years ago   Active 6 years ago   Viewed 17k times



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As many other people, I'm having troubles running a model which uses glmer function from package lme4.

Here is my model:

```
model = glmer(depvar ~ variety*cover+amplitude+time+ (1|pp) + (1|stim),
  data = datafile, family=poisson)
```

And here is the warning I get:

```
Warning message:
In checkConv(attr(opt, "derivs"), opt$par,
  ctrl = control$checkConv, :
  Model failed to converge with max|grad| = 0.00606839
  (tol = 0.001, component 1)
```

I read at [this link](#) that if I add

```
control=glmerControl(optimizer="bobyqa", optCtrl=list(maxfun=100000))
```

at the end of my model, I solve the issue. I tried, so my model is now:

```
model = glmer(depvar ~ variety*cover+amplitude+time+
  (1|pp) + (1|stim), data = datafile, family=poisson,
  control=glmerControl(optimizer="bobyqa",
    optCtrl=list(maxfun=100000)))
```

and it works without giving any warning message.

I would like to ask whether someone could explain what I am adding to the model, because I am not sure if I understand it. Also, is this an acceptable solution to solve the warning issue? Or anyone solved it in a different way?

Many thanks.

The output without `control=glmerControl(optimizer="bobyqa", optCtrl=list(maxfun=100000))` is:

```
Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)
[ 'glmerMod' ]
```

```

      AIC      BIC    logLik deviance df.resid
6916.6   6963.1  -3450.3   6900.6     2473

Scaled residuals:
   Min       1Q   Median       3Q      Max
-0.8955 -0.4712 -0.2797  0.3163  3.0090

Random effects:
Groups Name      Variance Std.Dev.
stim  (Intercept) 0.031757 0.17821
pp    (Intercept) 0.008918 0.09443
Number of obs: 2481, groups:  stim, 200; pp, 28

Fixed effects:
              Estimate Std. Error z value Pr(>|z|)
(Intercept)    0.77480    0.21459   3.611 0.000305 ***
variety2-1      0.04813    0.03096   1.555 0.119969
cover2-1        0.06725    0.03096   2.172 0.029862 *
amplitude      -0.04704    0.02685  -1.752 0.079837 .
time           -0.02545    0.03747  -0.679 0.496943
variety2-1:cover2-1 0.01435    0.06170   0.233 0.816128
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
convergence code: 0
Model failed to converge with max|grad| = 0.00606839 (tol = 0.001,      component 1)
```

The output with `control=glmerControl(optimizer="bobyqa", optCtrl=list(maxfun=100000))` is:

```

Generalized linear mixed model fit by maximum likelihood (Laplace      Approximation)
[ 'glmerMod' ]
Family: poisson ( log )
Formula: depvar ~ variety * cover + amplitude + time + (1 | pp) + (1 | stim)
Data: datafile
Control: glmerControl(optimizer = "bobyqa", optCtrl = list(maxfun = 1e+05))

      AIC      BIC    logLik deviance df.resid
6916.6   6963.1  -3450.3   6900.6     2473

      Scaled residuals:
      Min       1Q   Median       3Q      Max
-0.8956 -0.4712 -0.2797  0.3163  3.0090

Random effects:
Groups Name      Variance Std.Dev.
stim  (Intercept) 0.031759 0.17821
pp    (Intercept) 0.008917 0.09443
Number of obs: 2481, groups:  stim, 200; pp, 28

Fixed effects:
              Estimate Std. Error z value Pr(>|z|)
(Intercept)    0.77480    0.21457   3.611 0.000305 ***
variety2-1      0.04813    0.03096   1.555 0.119997
cover2-1        0.06725    0.03096   2.172 0.029860 *
amplitude      -0.04703    0.02685  -1.751 0.079861 .
time           -0.02545    0.03746  -0.679 0.496889
variety2-1:cover2-1 0.01434    0.06170   0.232 0.816160
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

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edited Apr 13 '17 at 12:44



Community Bot

1 1

asked Nov 12 '15 at 11:40



dede

1,027

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1 You should read `help("convergence")` . – Roland Nov 12 '15 at 11:51

@Roland I understand that I should "try all available optimizers (e.g. several different implementations of BOBYQA and Nelder-Mead, L-BFGS-B from `optim`, `nlm`, ...) While this will of course be slow for large fits, we consider it the gold standard; if all optimizers converge to values that are practically equivalent, then we would consider the convergence warnings to be false positives." (from the `help('convergence')`). But I would like to understand why we need to use "bobyqa" as optimizer in this case..what does it do? – dede Nov 12 '15 at 11:58

3 The first point is that this warning might be a false positive. The help doesn't say that 'we need to use "bobyqa"'. It says that we can and that we should compare results with results from other optimizers. However, you did not use a different optimizer (bobyqa is the default for `glmer` ) but rather increased the "maximum allowed number of function evaluations", i.e., allowed more iterations for attempting to reach convergence. – Roland Nov 12 '15 at 12:06

how different are your results with the two different approaches? Can you show us the results of `summary()` of the two models? – Ben Bolker Nov 12 '15 at 12:28

@BenBolker I added the results of the two models directly in the description of the question. – dede Nov 12 '15 at 13:33

1 Answer

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Since the likelihood differs by  $<0.1$  between the model fits, and the largest relative differences in the parameters are of the order of about  $10^{(-4)}$ , I would say that you have successfully demonstrated that the warning is a false positive and you can proceed with your initial model.

Switching the optimizer to "bobyqa" and extending the maximum number of iterations to suppress the warning is harmless (except in wasting computer time), but not necessary.

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edited Nov 12 '15 at 15:26

answered Nov 12 '15 at 14:29



Ben Bolker

183k

22 327 404

Many thanks for your answer, @BenBolker. So, would it be correct to say that there is no need to add the `control=glmerControl(optimizer="bobyqa", optCtrl=list(maxfun=100000))` , but that nothing is wrong if I add it, because it will only increase the number of iterations? – dede Nov 12 '15 at 14:48

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