Laplace iterations stops due to bad tau

In some cases when Laplace is used as method of estimation for non-linear (HGLM) models, the iterative procedure will terminate prematurely with a message indicating that it is unable to continue due to a "bad tau".

Here a "bad tau" is a covariance matrix with very small or even negative variances (diagonal elements). The continuation of the iterative procedure is dependent on the inversion of the tau matrix and as a matrix with elements as described above does not have a unique inverse, this causes problems.

In the case of standard Expected Maximization (EM) runs, the program will endlessly try to fix such a tau by adding small values or constraining off-diagonal elements to zero. The result is quite often that the procedure fails to reach convergence, regardless of the maximum number of iterations allowed.

In the case of Laplace iterations, however, this does not happen. The moment a tau matrix which cannot be converted is encountered, the program will stop with a message referring to a "bad tau". The cause of this message can usually be found by inspecting the tau matrix given in the output file. Small or negative diagonal elements in the tau matrix, or high correlations in the tau (as correlations) matrix are likely causes. Possible solutions are to try centering the predictors involved or removing the random effect associated with the diagonal element of tau that caused the problem.