The failure of the convergence can be caused by the negative variance components that have been estimated. In this case, the fisher’s scoring algorithm will not be able to converge. Jump between two sets of variance component estimates.

The failure of convergence can also be caused of the measurement error, i.e. sigma^2, been set too small. Note that, sigma^2 will never be negative. In this case, the information matrix becomes invertible. However, this issue can be fixed by setting the measurement error higher.

Failure rate of convergence stay consistent between different simulations.

Base on two simulation datasets, i.e. 20000 data sets:

The higher the ratio, the less likely the convergence will fail and better the estimates.

If the ratio of the sigma^2\_arrary/ sigma^2 = 0, the failure rate can be as high as 1.6%.

If the ratio of the sigma^2\_arrary/ sigma^2 = 0.25, the failure rate can be as high as 1.5%.

If the ratio of the sigma^2\_arrary/ sigma^2 = 1, the failure rate can be as high as 1.0%.

If the ratio of the sigma^2\_arrary/ sigma^2 = 4, the failure rate can be as high as 0.2%.

If the ratio of the sigma^2\_arrary/ sigma^2 = 100, there was only one failure.