This is the scheme of the bgaPEST:

1. *bga loop* - *1* to *it\_max\_bga*
2. *quasi linear loop - 1* to *it\_max\_phi (the “best” parameters are calculated and used to run b.)*
3. *structural parameter optimization loop* (**If, before the last iteration of the *bga loop,* the structural parameters have converged, the structural parameters optimization is set to zero** (means that it is no more required). **The last structural parameters are used to run the *quasi linear loop,* for the last time, and the *bga loop* is left** (there is an *exit* statement, even if the *it\_max\_bga* is not reached).

end *bga loop*

1. *Calculate the posterior covariance (matrix or diagonal terms)*

Now the problems/cases that we need to handle in some way, I think are:

1. The structural parameters do not converge before the **last** iteration of the *bga loop.*

In this case the last estimated structural parameters are not used to run the final quasi linear loop but they are used to evaluate the posterior covariance matrix if required.

(This is also the case in which *it\_max\_bga* is set to 1, in fact, in this case, we run the *quasi linear loop*, we estimate the structural parameters and then we exit the *bga\_loop.* The estimated structural parameters are used to calculate the posterior covariance matrix).

* One solution could be to have a warning that just say this (maybe handling the case *it\_max\_bga=1*).
* Another solution could be: if we are at the last *it\_max\_bga* and the structural parameters have not converged (that in case *it\_max\_bga=1* is the first iteration), we do not enter the structural parameter optimization loop and we put a warning saying this. But in this way the *quasi linear loop*, the structural parameters and then the *posterior covariance* matrix are all consistent and calculated with the same structural parameters (even if they are not the final ones).
* ***Marco---I like the second option. I think it’s good that posterior covariance, parameters estimated, and structural parameters are all consistent.***

1. Put a warning if *it\_max\_phi* is reached without convergence in the quasi linear loop. (This is just a remind, already there is a note in TODO\_list file.).

***DONE***

I already put a warning in case the *it\_max\_structural* is reached in NealMeald function trying to minimize the structural parameter objective function. The warning says: “Warning: Maximum number of iterations exceeded in structural parameter optimization procedure during bgaPEST iteration ???. The vector that gives the minimum obj. funct. during the procedure will be considered.”

Moreover, already there is a warning in the linesearch procedure in case *it\_max\_linesearch* is reached in NealMeald function trying to minimize the quasi linear objective function. The warning says: “Warning: Maximum number of iterations exceeded in linesearch procedure during quasi-linear iteration ???. The value that gives the minimum obj. funct. during the procedure will be considered.”