Questions:

1. ABOUT TRANSFORMATION OF SENSITIVITY IN LOG SPACE (ESTIMATION SPACE)

Suppose we require for some *beta_assocition* the transformation of the related parameters in the estimation space. We need to transform the related sensitivities in the estimation space too. Now suppose we finished the first quasi-linear loop and we have the best set of parameters (they are back transformed, because we do that), sensitivities are still in the estimation space. Now we enter the structural parameter estimation loop. We need to calculate again: z = y – h – Hs – HXbeta_0 and Gyy = H*Qss*H' + HXQbbX'H' and other terms that not depend on H.

What about the sensitivities? Can they remain in the estimation space or we need to back transform them? [1]

Anyway right now there is an error because H is in the estimation space, but the parameters are back transformed, so the calculation of Hs is not correct.

Again, also for the posterior covariance matrix, must be sensitivities in the estimation space or physical space?

2. PRIOR MEANS CONTROL VARIABLES BLOCK

In this block we have *beta_flag* that can be 0 or 1 and *Qbb_form* that can be 0, 1 or 2.

My concern is: suppose we have *beta_flag=1* (means we have prior information about means), can *Qbb_form* be 0 (that means no beta covariance)? Or we always requires Qbb?

Why my concern? For the cokriging system no problem, this case must be equal to the case with no prior means (but the case must to be addressed because right now the code tries to calculate the inverse of Qbb and of course if we don't have Qbb there is an error).

Now going to the structural parameters objective function, there we have the terms:

i. z = y – h – Hs – HXbeta_0 that in case of *beta_flag=1* requires beta_0 (but not Qbb)
ii. Gyy = Qyy + HXQbbX'H' that requires only Qbb (but if *Qbb_form=0* we don't have this term)

So, can coexist *beta_flag=1* and *Qbb_form=0*? If yes we need to address this case.

Also for the posterior covariance, now I have assumed that if *beta_flag=1*, Qbb exists.

[1] In case we need sensitivities in the physical space, we will have some conflict with the values of *beta_0* and the values of *Qbb* that correspond to the beta_associations that require transformation, that we said must be entered already transformed (in the estimation space).

3. ABOUT STRUCTURAL PARAMETERS ESTIMATION

We said by phone to handle the case in which we want to estimate the structural parameters but we don't have $Q_{\theta\theta}$ (*theta_cov_form=0*) and/or we don't have prior information about covariance of sigma. Is it right?