Approxposterior (BAPE) Convergence issue

After the meeting on 15th March 2021 we decided to look into few things to check the convergence issue of the BAPE implementation in Approxpoeterior.

Convergence of posterior issue:

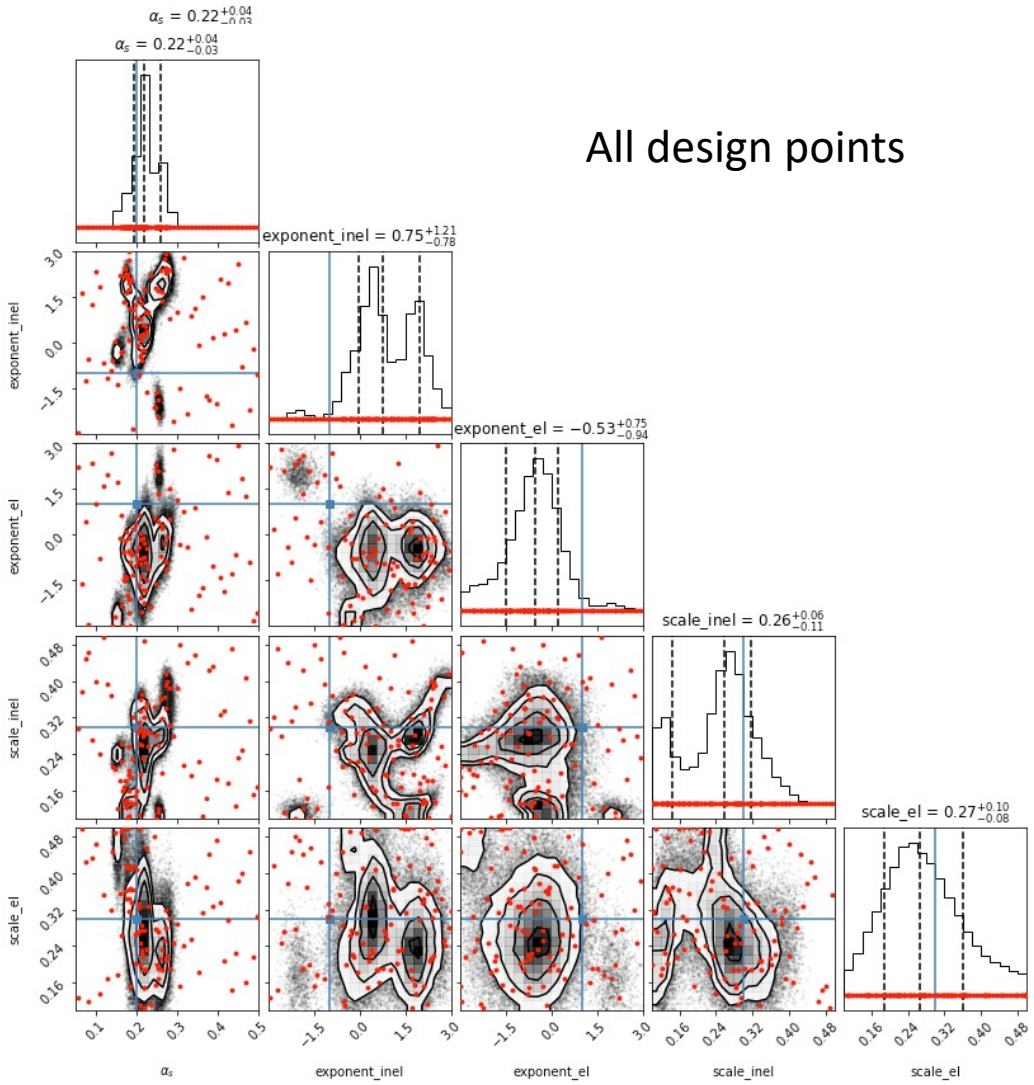
When we change the number of re optimizations in the GP hyperparameter optimization the final posterior changes significantly.

- Simon suggested increasing the number of design points to see if the convergence of posterior issue is still there.

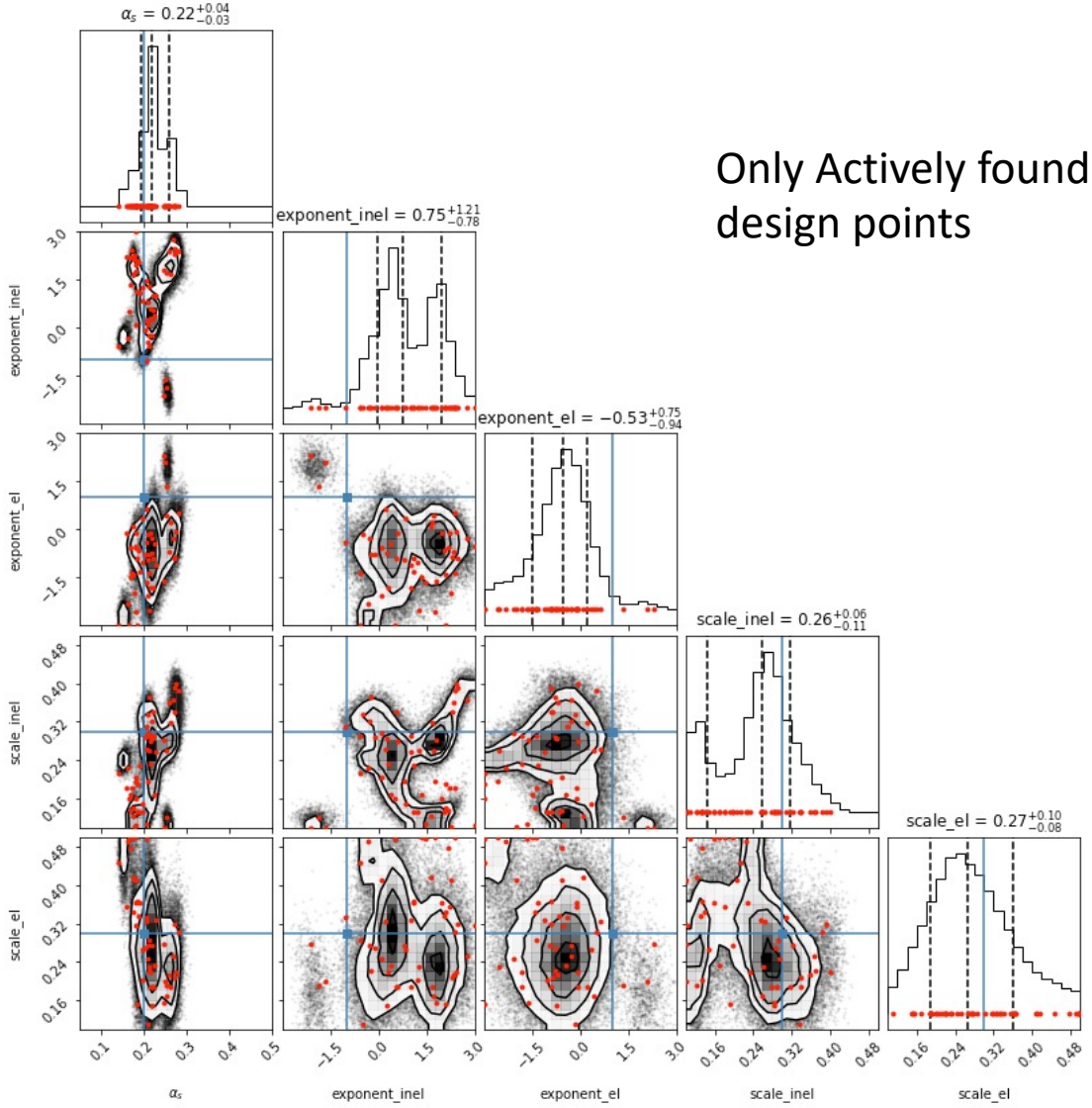
All the plots shown below
have 50 initial design points
from a Min Max Lattin Hypercube Sampling.
Active sampling has been done in batches of 5.

20 n_gp_restarts , 5 nMinObjRestarts

All design points

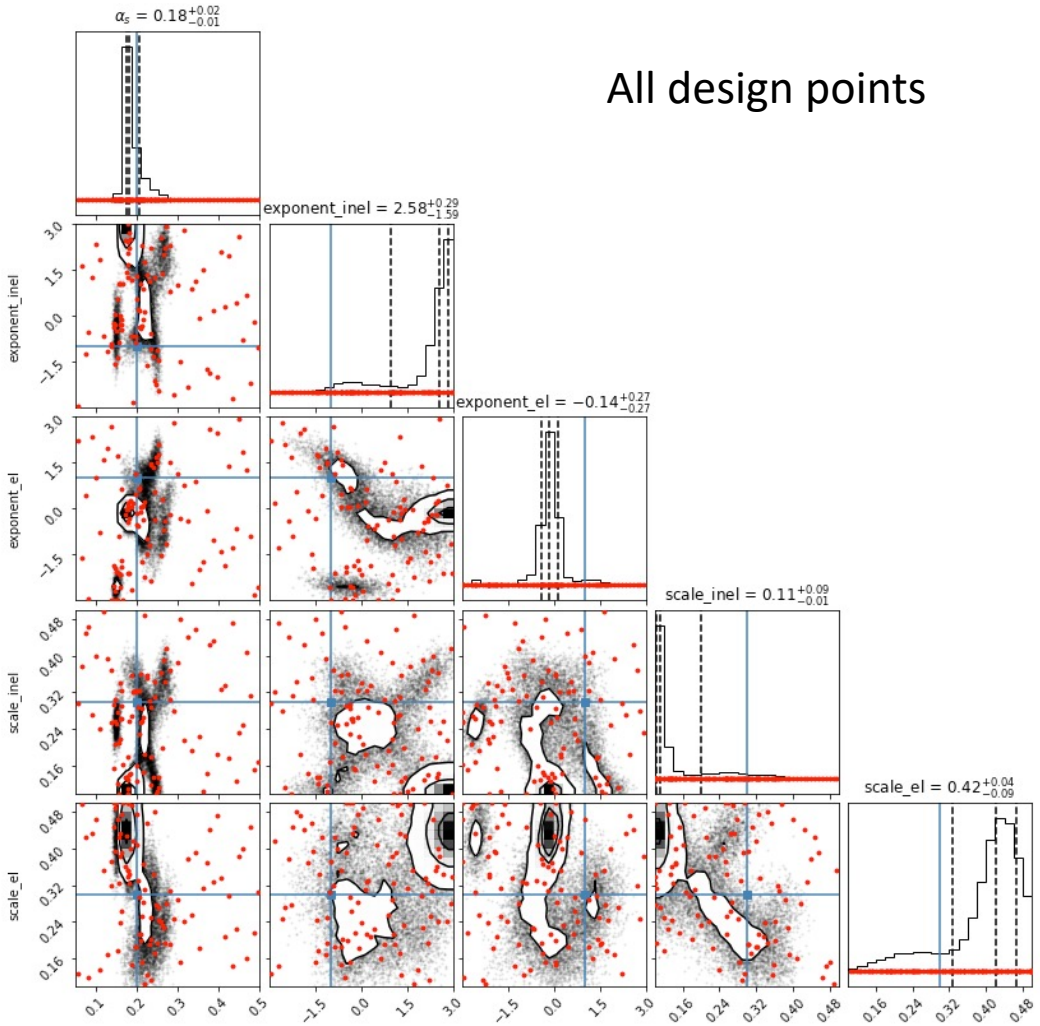


Only Actively found design points

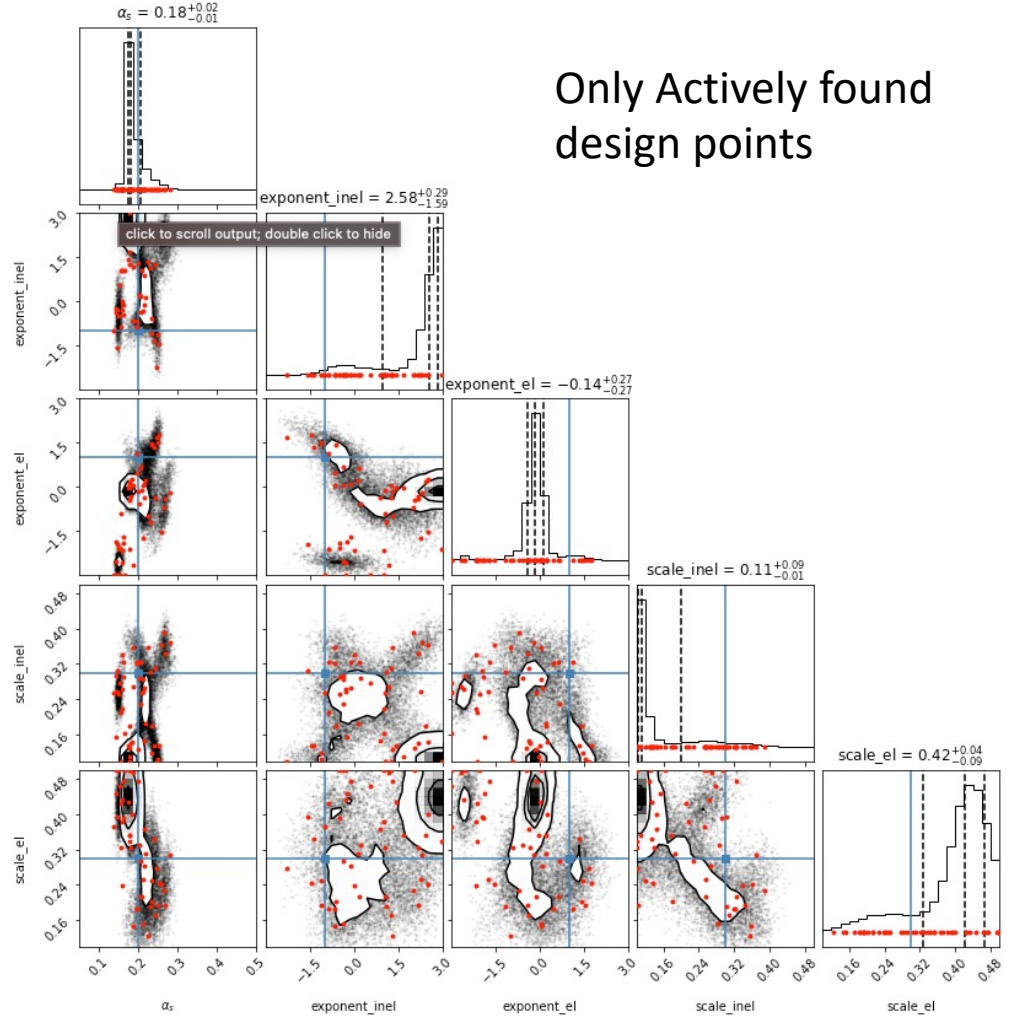


30 n_gp_restart, 5 nMinObjRestarts

All design points

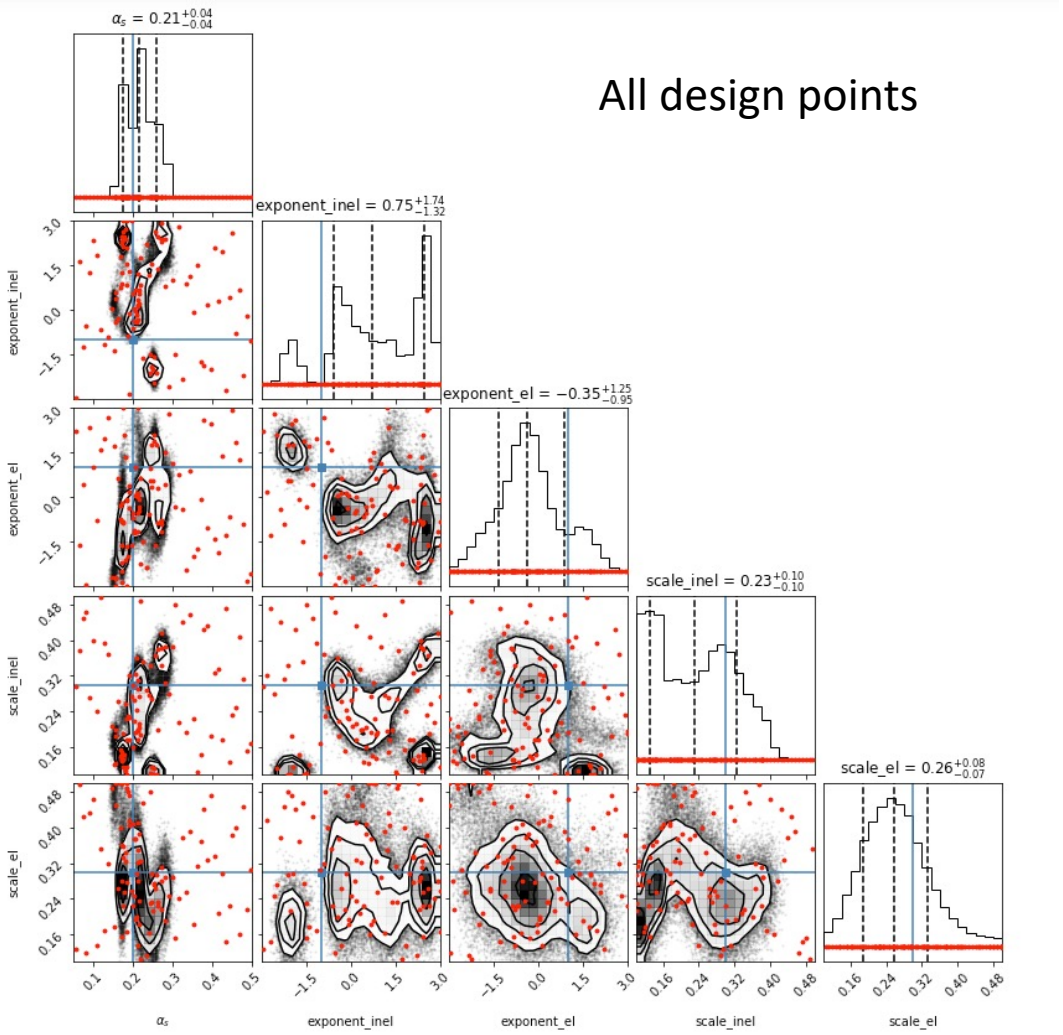


Only Actively found design points

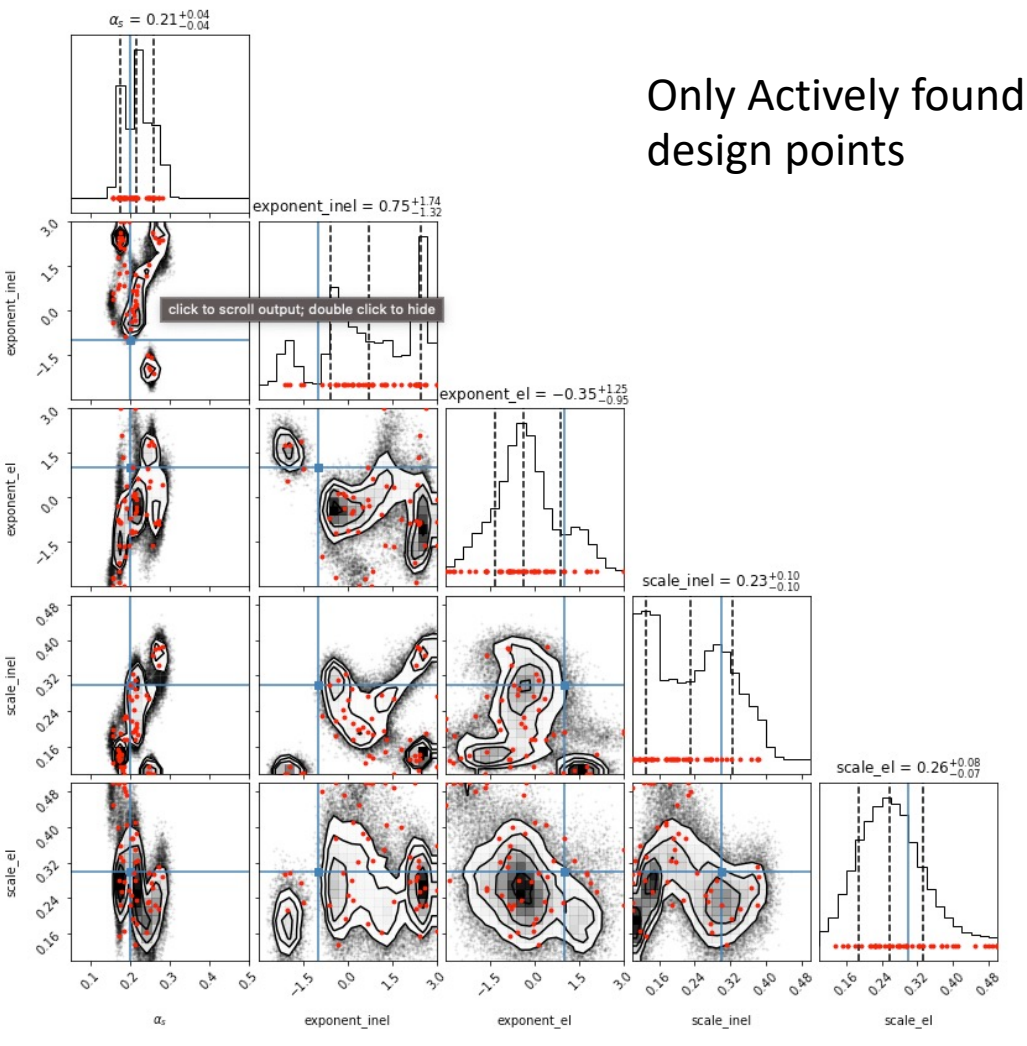


50 n_gp_restart, 5 nMinObjRestarts

All design points

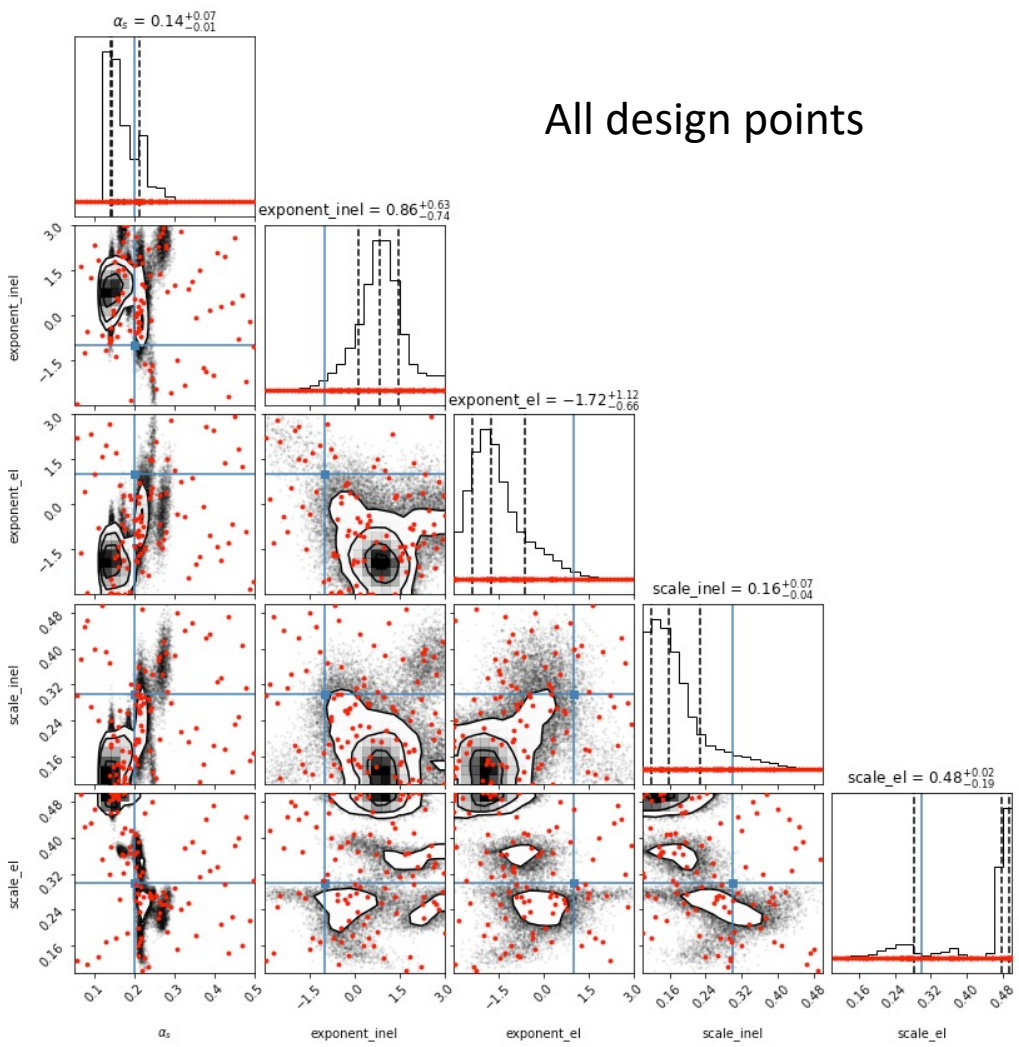


Only Actively found design points

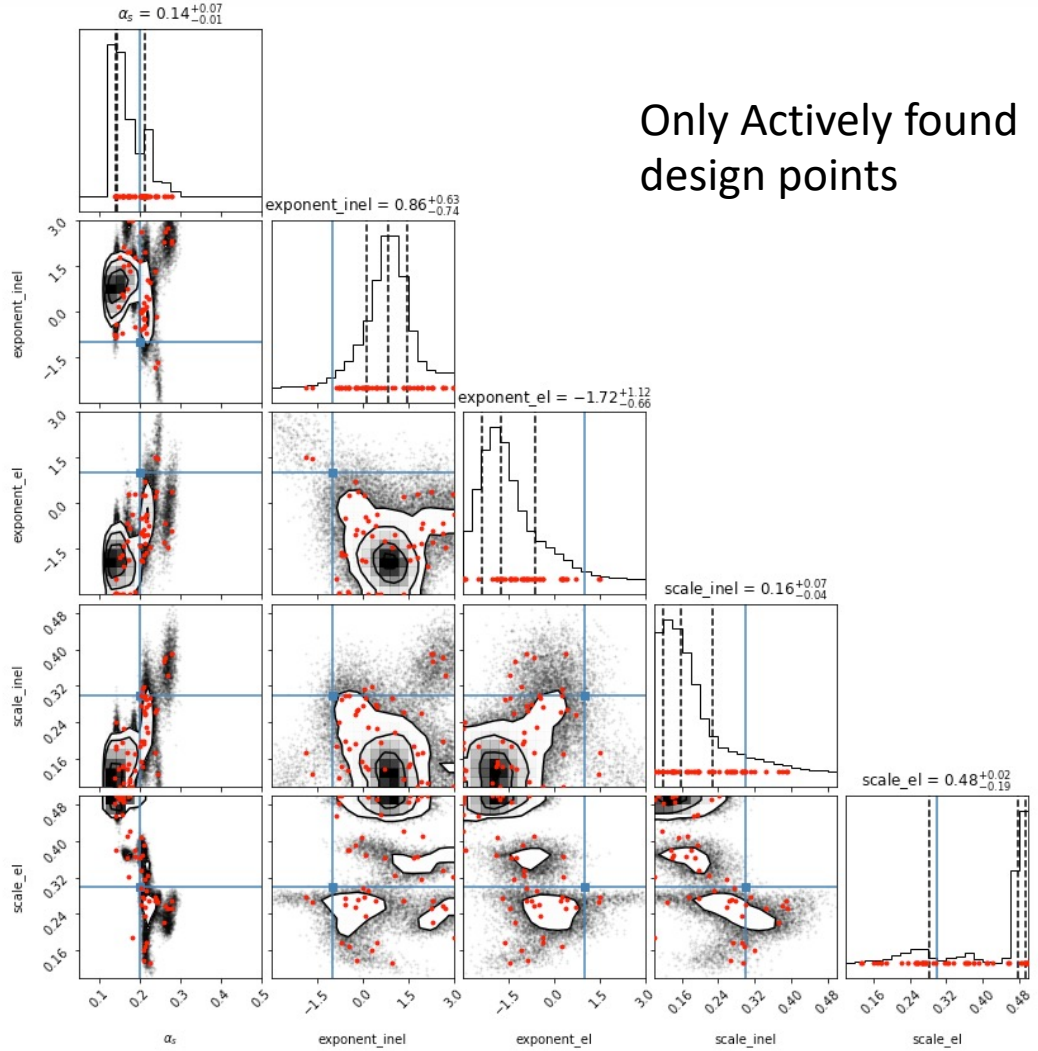


100 n_gp_restart, 5 nMinObjRestarts

All design points



Only Actively found design points

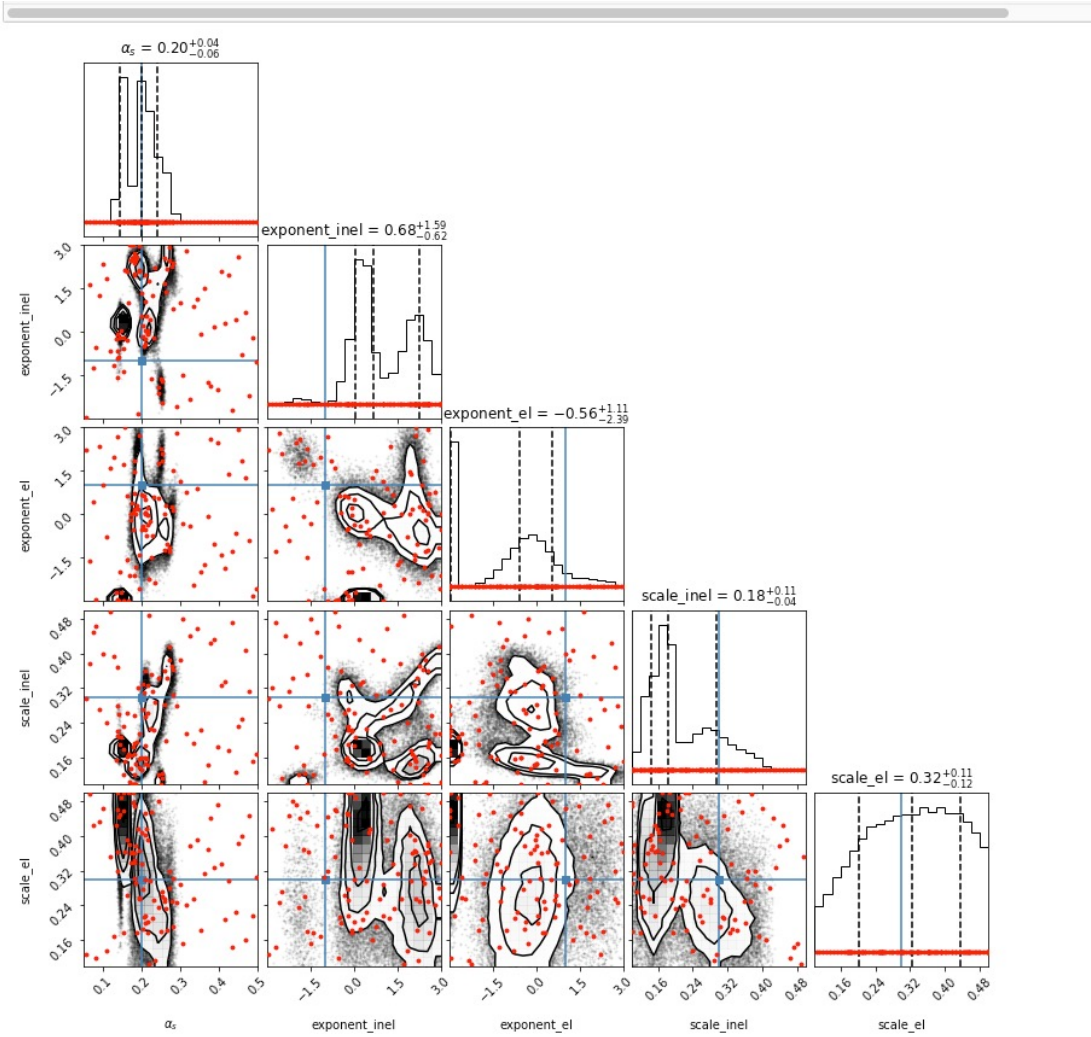


Convergence of posterior issue:

When we change the number of re optimizations in the GP hyperparameter optimization the final posterior changes significantly.

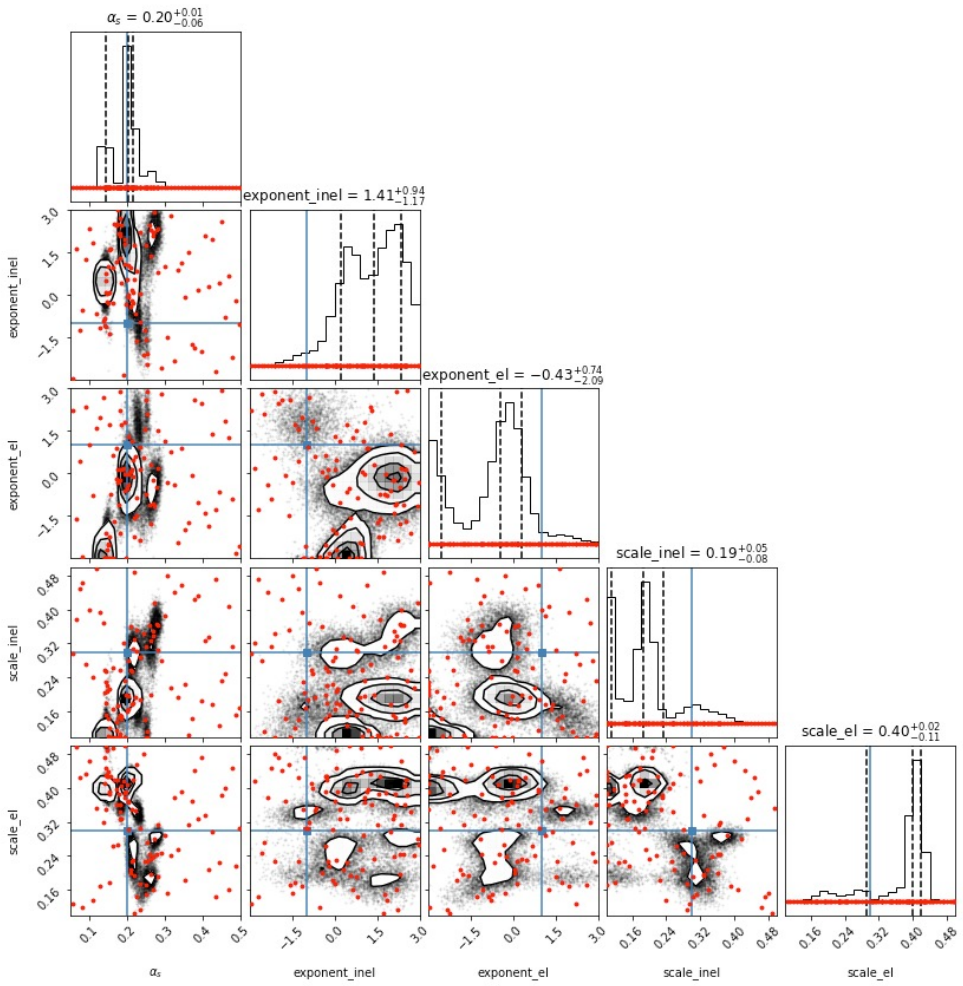
- Simon suggested increasing the number of design points to see if the convergence of posterior issue is still there.
- I also tried to increase the number of re optimizations in the active learning batch points finding algorithm.
  - I rerun all the previous n_gp_restart but now with 50 nminobjectRestarts instead of default 5.

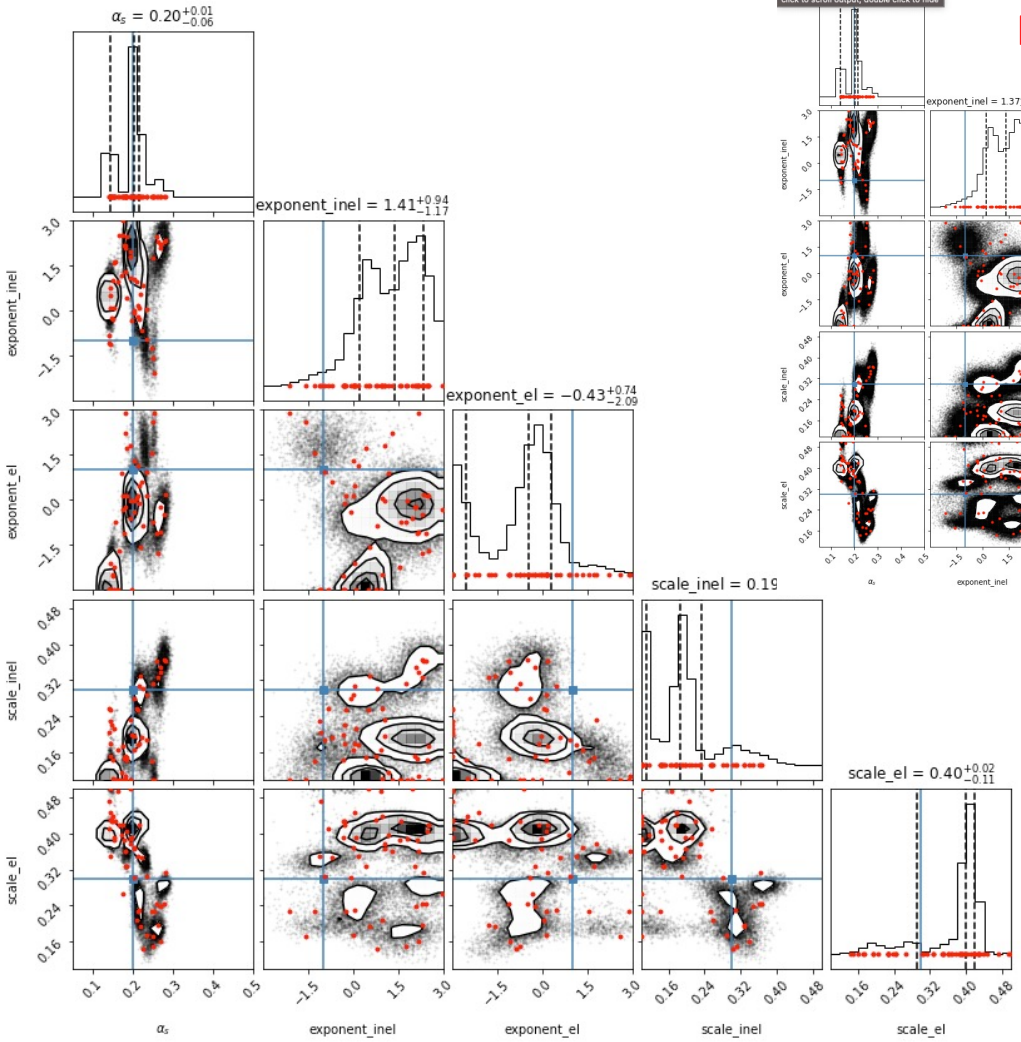
100 n_gp_restarts, 50 nMinObjRestarts

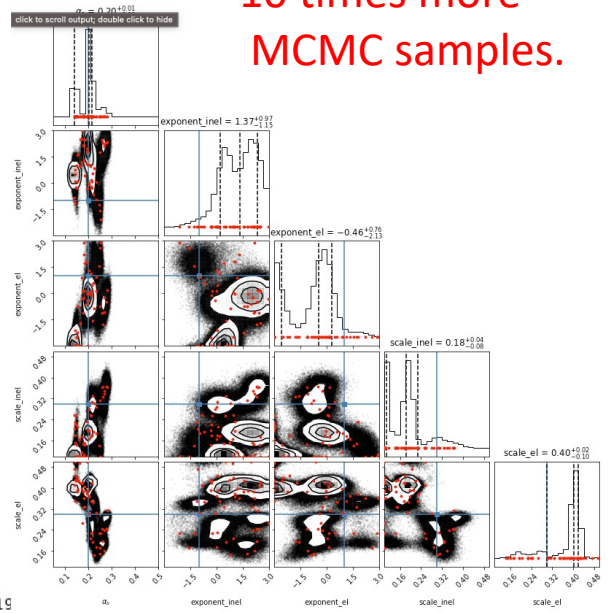


50 N_gp_restarts, 50 nMinObjRestarts

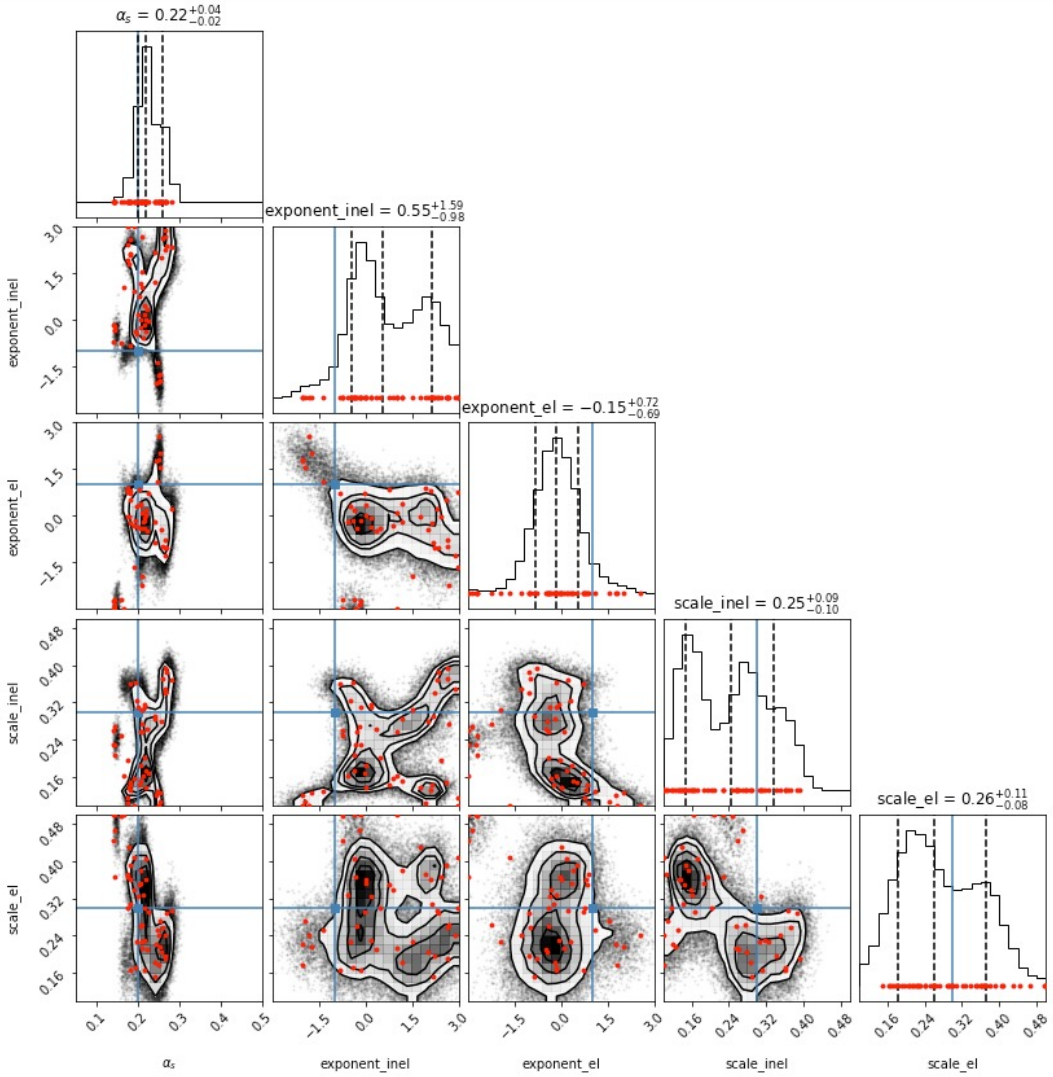
Wanted to cjeck if this is A MCMC issue. So got 10 times more MCMC samples.



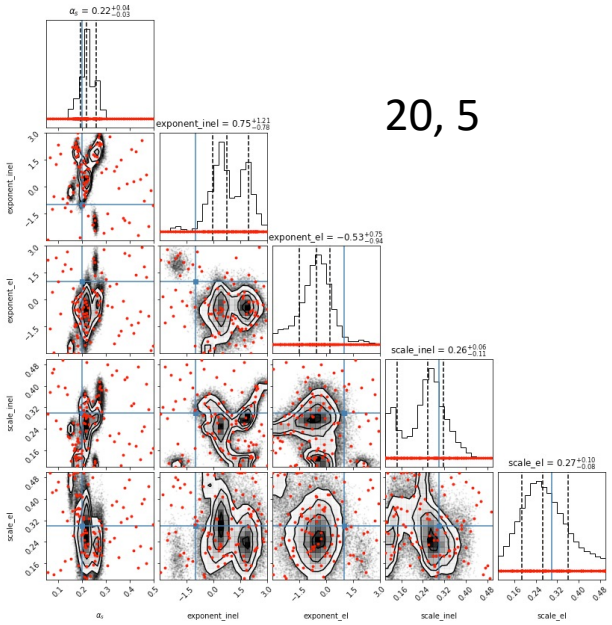


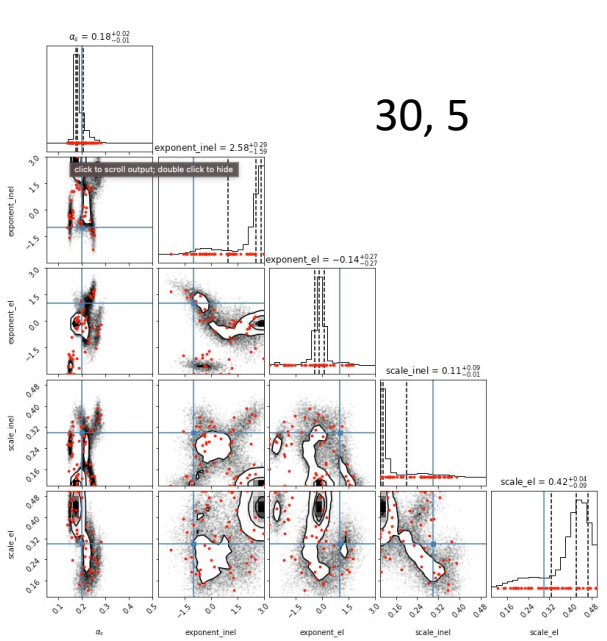


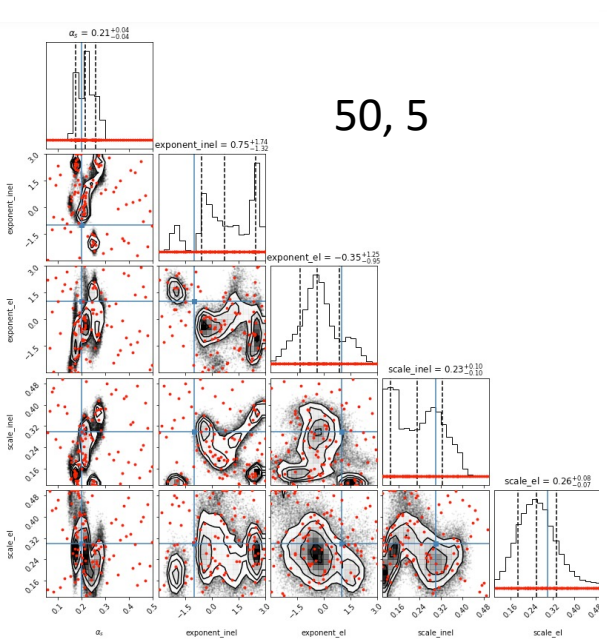
30 n_gp_restarts, 50 nMinObjRestarts

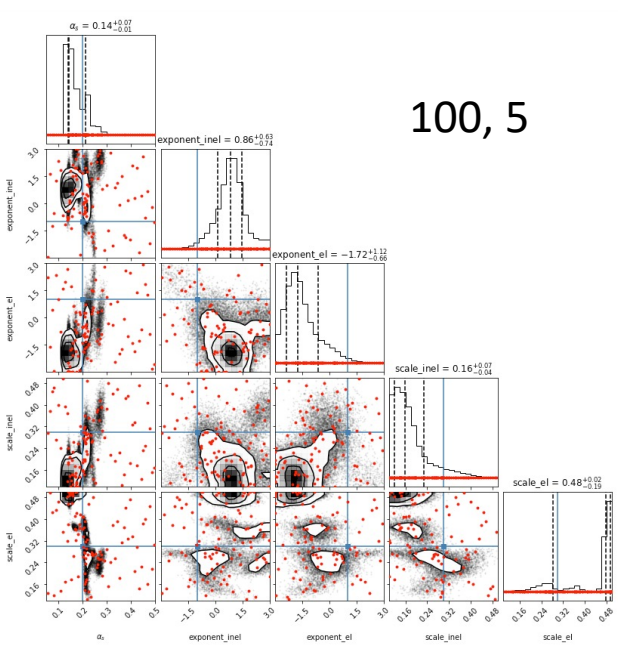


Summary of all the Plots









In the top row we only change n_gp_restarts and keep noptimizationrestarts fixed to 5. The bottom row is the same but now we fix noptimizationrestart to 50.

Conclusion:

Now the posteriors are not completely different from one another. There is a common structure. But still there are differences. How do we improve this and get a convergent posterior?