7-5-2024

Numerical experiments

Suggested setting: correlation length ~ 0.2, just not to have circle.
Have a $\hat{r}$ which is "far enough"
"r_{true}"
from prior average.

Mesh scaling with frequency: $h^2 K^3 \leq C_1$
so $h \sim K^{-3/2}$

(cf. Lafontaine, Spence, Wunsch, Numerische Mathematik, 2022)

Number of SMC particles s.t. the results are robust (using more particles would not change the results significantly).

Tentative plan:

make changes in the data by changing the noise (not its magnitude), so we get two posteriors per frequency. Hope is that, at higher frequency, we see visually that the two posteriors are more different.

Choosing a σ^2, generate $\eta_1 \sim \mathcal{N}(0, \sigma^2)$

Generate η_2 by rotation $\eta_2 = \underline{O}\eta_1$, for $\underline{O}$ a rotation matrix (hope this does not mess up with direction of u_i)

~~⇝ we get posteriors μ~~

For $\hat{r}$ ~~fix~~, $\delta_1 = G(\hat{r}) + \eta_1$

$\delta_2 = G(\hat{r}) + \eta_2$

⇝ we get posteriors μ^{δ_1} and μ^{δ_2}.

Repeat this for different frequencies, e.g.

$f_1 = 5 \cdot 10^8$, $f_2 = 10^9$, $f_3 = 2 \cdot 10^9$

↑ now I got the doubt that tere domain →

should contain some wavelengths.
If not, we should consider $4 \cdot 10^9$ instead of $5 \cdot 10^8$. In this case, we could first just look at results with 10^9 and $2 \cdot 10^9$ and leave last one for final results.

Note: η_1 and η_2 I think should be kept the same (not resampled) for all frequencies

Suggestions for visualizing results:

for each frequency,

- plots with mean and 1σ-interval (as in thesis)
- plots of marginal posteriors of a couple of Y_j (e.g. Y_1, Y_2 or Y_1, Y_3 or Y_2, Y_4, ~~depending~~ ~~might~~ those who change more)

for each, one plot for μ_1, one for μ_2.

- computing $\|\mathbb{E}^{\mu_1}(r) - \mathbb{E}^{\mu_2}(r)\|_{C^{0,1}}$