

Lab Exercise 2

Load the data `lab_data.csv` and the following packages in R by running the code below.

```
chikwawa <- read.csv("lab_data.csv")
load(PrevMap)
load(lme4)
```

Consider the following linear geostistical model

$$\text{Hb}_{ij} = \alpha + \beta \text{sex}_{ij} + S(x_i) + U_{ij}$$

where $S(x)$ is a Gaussian process with exponential correlation function, i.e.

$$\text{Cov}(S(x), S(x')) = \sigma^2 \exp\{-u/\phi\}$$

and the U_{ij} are i.i.d. zero-mean Gaussian variables with variance ω^2 .

1. Use the function `check.corr` to obtain initial values for σ^2 and ϕ . How can you get an initial value for ω^2 ?
2. Estimate a linear geostatistical model using the function `linear.model.MLE`. **Note:** Since there are multiple individuals at the same locations, use the argument `ID.coords` to specify the household IDs. Also, `start.cov.pars` now requires two initial values, the first for ϕ and the second for ω^2/σ^2 .
3. Carry out the validation of the adopted correlation function using `variog.diagnostic.lm`. What do you conclude?