ESM232 Assignment 4

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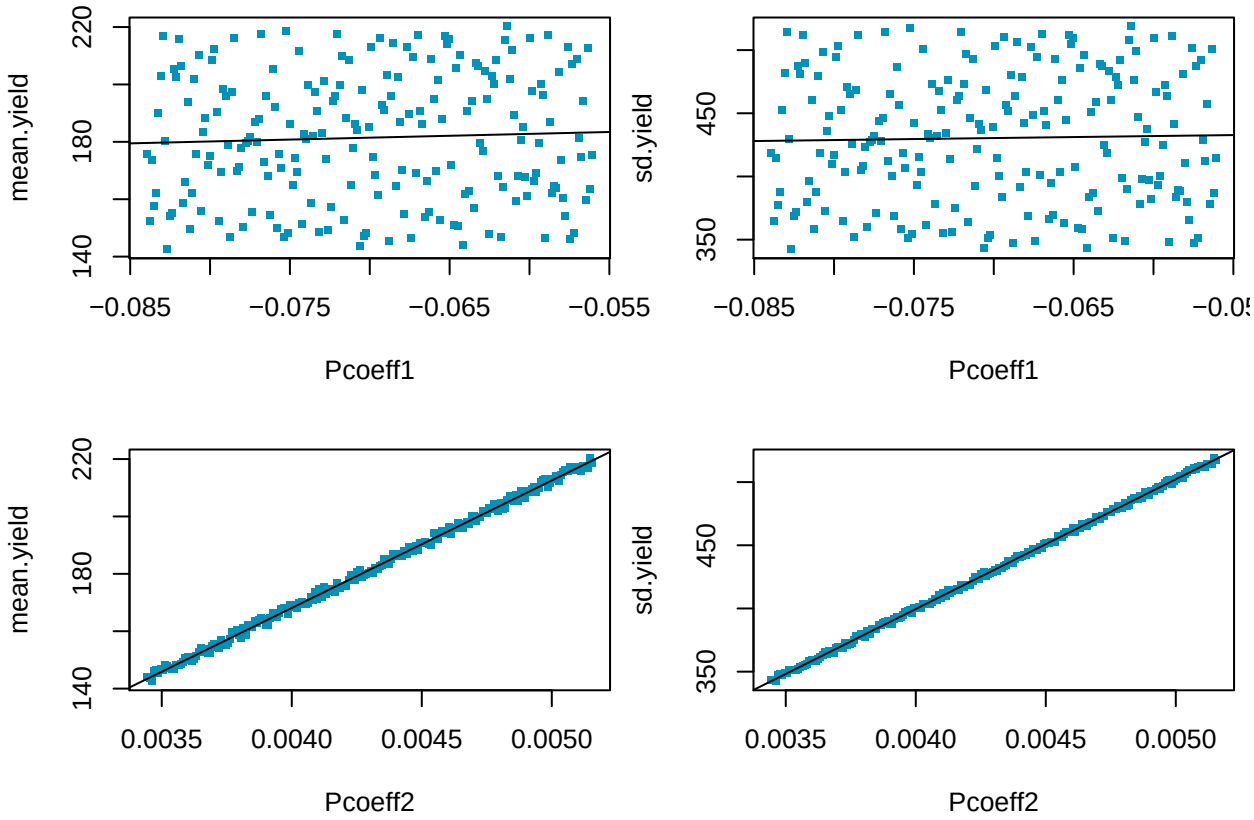
```
# load function named almond_yield_range
source("almond_yield_range.R")

# load sample data
climate <- read.table("clim.txt")
```

```
# set the default values for Pcoeff1 and Pcoeff2
Pcoeff1=-0.07
Pcoeff2=0.0043

# prepare statements for sensitivity analysis
factors = c("Pcoeff1", "Pcoeff2")
nsets = 200
q = c("qunif","qunif")
q.arg = list(list(max = (1-0.2)*Pcoeff1,
                  min = (1+0.2)*Pcoeff1),
             list(min = (1-0.2)*Pcoeff2,
                  max = (1+0.2)*Pcoeff2))

# build the distribution based on the statements
sens.almond = LHS(model = NULL,
                  factors = factors,
                  N = nsets,
                  q = q,
                  q.arg = q.arg)

# generate a sample dataset from LHS
sens.data = get.data(sens.almond)
```

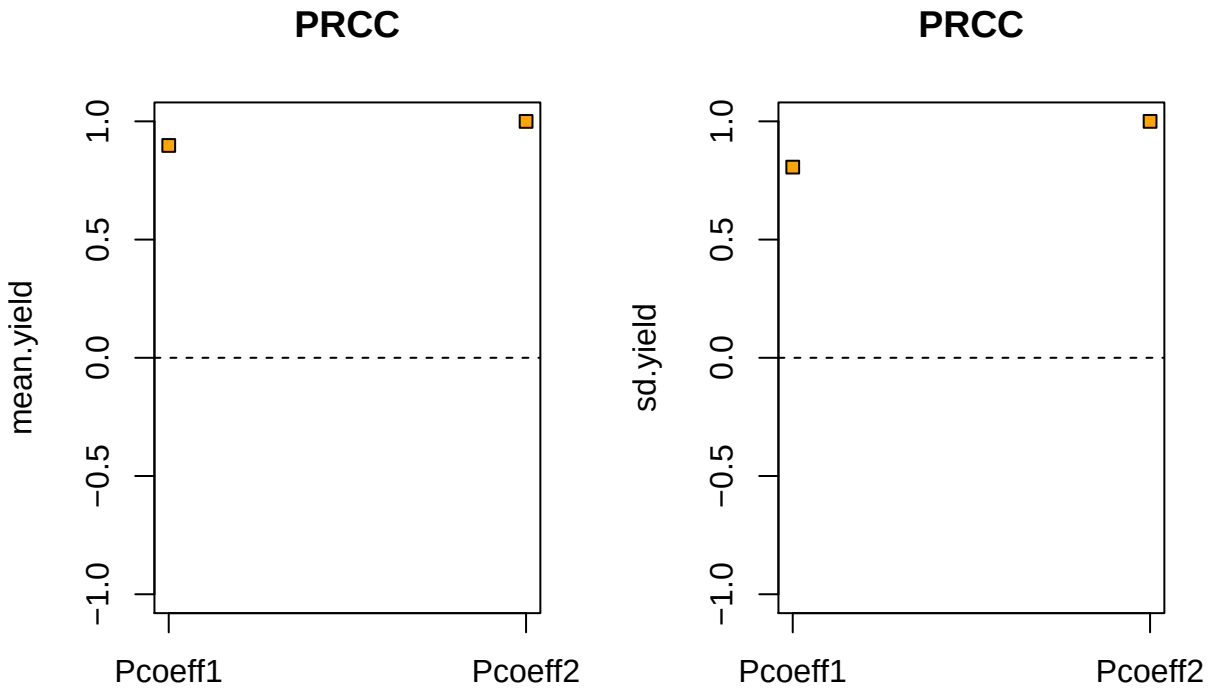
```
# apply the P coeff sensitivity data and the climate data to the almond yield function
sens.results = pmap_dfr(.l = list(Pcoeff1 = sens.data$Pcoeff1,
                                  Pcoeff2 = sens.data$Pcoeff2),
                        .f = almond_yield_range,
                        clim = climate)
```

```
# connect the statements of sensitivity analysis with the results of model application
sens.plot.pre <- pse::tell(sens.almond,
                           t(as.matrix(sens.results)),
                           res.names=c("mean.yield","sd.yield"))
```

```
# make a scatter plot that shows how output change with parameter uncertainties
pse::plotscatter(sens.plot.pre,
                 col="#0092B9", cex=5)
```




```
# A small increase in Pcoeff2 would positively influence the mean and sd of yield,
# while Pcoeff1 seems to have less influence.

# make a plot of PRCC
pse::plotprcc(sens.plot.pre)
```




```
# sens.plot.pre$prcc

# The partial rank correlation coefficients of Pcoeff2 are higher than those of Pcoeff1.
```

Based on the results from the two graphs, the coefficient related to P^2 contributes more to the parameter uncertainty.