

# Assignment 1: Modelling the skills of Go players

Salvador Garcia, s1655274

28 Marzo 2017

## 1 Question 3

b)

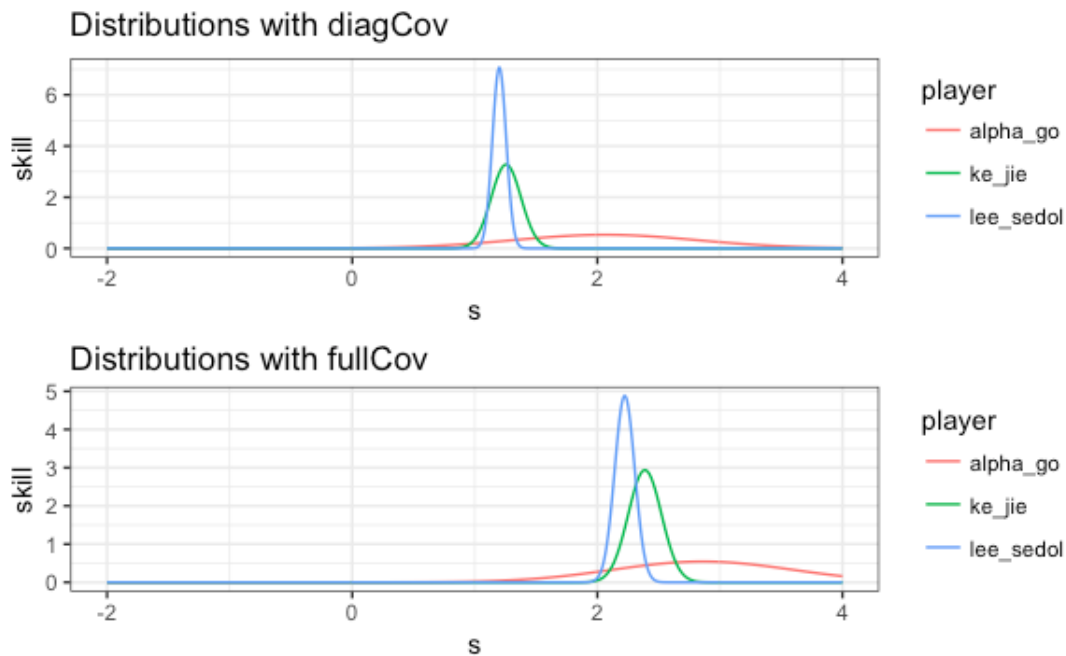


Figure 1: Posterior distributions with full and diag covariance matrix

```
library(tidyverse)
library(R.matlab)

diagCov <- readMat("diag_covar.mat")
fullCov <- readMat("full_covar.mat")

attach(diagCov) #-----
s = seq(-2,4, by = .01)
alpha_go <- dnorm(s, approx.mean[alpha_go.id], sqrt(approx.covar[alpha_go.id]))
ke_jie <- dnorm(s, approx.mean[ke_jie.id], sqrt(approx.covar[ke_jie.id]))
lee_sedol <- dnorm(s, approx.mean[lee_sedol.id], sqrt(approx.covar[lee_sedol.id]))

diagcov_df <- data.frame(s, alpha_go, ke_jie, lee_sedol) %>%
  gather(player, skill, -s)
```

```

p1 <- diagcov_df %>%
  ggplot(aes(x = s, y = skill, group = player, color = player))+
  geom_line() +
  labs(title = "Distributions with diagCov")+
  theme_bw()
detach(diagCov)

attach(fullCov) #—————
s = seq(-2,4, by = .01)
alpha_go <- dnorm(s, approx.mean[alpha.go.id], sqrt(approx.covar[alpha.go.id, alpha.go.id]))
ke_jie <- dnorm(s, approx.mean[ke.jie.id], sqrt(approx.covar[ke.jie.id, ke.jie.id]))
lee_sedol <- dnorm(s, approx.mean[lee.sedol.id], sqrt(approx.covar[lee.sedol.id, lee.sedol.id]))

fullcov_df <- data.frame(s, alpha_go, ke_jie, lee_sedol) %>%
  gather(player, skill, -s)

p2 <- fullcov_df %>%
  ggplot(aes(x = s, y = skill, group = player, color = player))+
  geom_line() +
  labs(title = "Distributions with fullCov")+
  theme_bw()
detach(fullCov)

grid.arrange(p1, p2)

```

**c)**

```

attach(diagCov) #—————
x_k = rep(0, n.players)
x_k[alpha.go.id] = 1/sqrt(2)
x_k[ke.jie.id] = -1/sqrt(2)

val_diag <- (approx.mean%%as.matrix(x_k))/
  sqrt(t(as.matrix(x_k))%%diag(c(approx.covar))%%as.matrix(x_k)+1)
pnorm(val_diag)
detach(diagCov)

attach(fullCov) #—————
# vector x_k
x_k = rep(0, n.players)
x_k[alpha.go.id] = 1/sqrt(2)
x_k[ke.jie.id] = -1/sqrt(2)

val_ful <- (approx.mean%%as.matrix(x_k))/
  sqrt(t(as.matrix(x_k))%%approx.covar%%as.matrix(x_k)+1)
pnorm(val_ful)
detach(fullCov)

```