Datos Capitulo 3

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Datos de la Liga Iberdrola 2020/2021 (<https://rfevb-web.dataproject.com/CompetitionHome.aspx?ID=68>)

# Liga Iberdrola 2020/2021

library(readxl)  
partidos2021 = read\_excel("Partidos\_20\_21.xlsx", sheet = 1, range= "A2:AA266", col\_names=T)  
head(partidos2021)

## # A tibble: 6 x 27  
## Equipo `Sets jugados` Tot BP G `G-P` `Saque-Tot` `Saque-Pts`  
## <chr> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 Cajasol Juvasa 5 71 27 44 30 107 6  
## 2 Cajasol Juvasa 4 68 29 39 40 95 3  
## 3 Cajasol Juvasa 5 79 37 42 39 102 7  
## 4 Cajasol Juvasa 4 58 22 36 20 89 6  
## 5 Cajasol Juvasa 3 27 11 16 -10 42 2  
## 6 Cajasol Juvasa 3 64 40 24 37 74 12  
## # ... with 19 more variables: Saque-Err <dbl>, Saque-Pts por set <dbl>,  
## # Saque-Efic <dbl>, Recep-Tot <dbl>, Recep-Err <dbl>, Recep-Neg <dbl>,  
## # Recep-Exc <dbl>, Recep-ExcPorc <dbl>, Recep-Efic <dbl>, Ataque-Tot <dbl>,  
## # Ataque-Err <dbl>, Ataque-Blo <dbl>, Ataque-Exc <dbl>, Ataque-ExcPorc <dbl>,  
## # Ataque-Efic <dbl>, Bloqueo-Red <dbl>, Bloqueo-Pts <dbl>,  
## # Bloqueo-Puntos por set <dbl>, Ganado/Perdido <dbl>

## Estudio descriptivo de los datos

str(partidos2021)

## tibble [264 x 27] (S3: tbl\_df/tbl/data.frame)  
## $ Equipo : chr [1:264] "Cajasol Juvasa" "Cajasol Juvasa" "Cajasol Juvasa" "Cajasol Juvasa" ...  
## $ Sets jugados : num [1:264] 5 4 5 4 3 3 5 5 3 4 ...  
## $ Tot : num [1:264] 71 68 79 58 27 64 64 75 42 59 ...  
## $ BP : num [1:264] 27 29 37 22 11 40 25 33 10 25 ...  
## $ G : num [1:264] 44 39 42 36 16 24 39 42 32 34 ...  
## $ G-P : num [1:264] 30 40 39 20 -10 37 7 23 11 10 ...  
## $ Saque-Tot : num [1:264] 107 95 102 89 42 74 81 100 50 82 ...  
## $ Saque-Pts : num [1:264] 6 3 7 6 2 12 8 4 2 7 ...  
## $ Saque-Err : num [1:264] 13 9 11 11 3 9 7 14 7 14 ...  
## $ Saque-Pts por set : num [1:264] 1.2 0.8 1.4 1.5 0.7 4 1.6 0.8 0.7 1.8 ...  
## $ Saque-Efic : num [1:264] -0.07 -0.06 -0.04 -0.06 -0.02 0.04 0.01 -0.1 -0.1 -0.09 ...  
## $ Recep-Tot : num [1:264] 100 80 91 89 67 49 104 89 74 84 ...  
## $ Recep-Err : num [1:264] 9 3 2 6 13 1 13 6 6 10 ...  
## $ Recep-Neg : num [1:264] 17 34 13 29 12 13 47 24 36 10 ...  
## $ Recep-Exc : num [1:264] 61 32 61 23 14 20 24 45 16 53 ...  
## $ Recep-ExcPorc : num [1:264] 0.61 0.4 0.67 0.26 0.21 0.41 0.23 0.51 0.22 0.63 ...  
## $ Recep-Efic : num [1:264] 0.52 0.36 0.65 0.19 0.01 0.39 0.11 0.44 0.14 0.51 ...  
## $ Ataque-Tot : num [1:264] 182 134 155 136 98 98 147 169 106 137 ...  
## $ Ataque-Err : num [1:264] 10 8 19 8 19 7 20 15 10 14 ...  
## $ Ataque-Blo : num [1:264] 9 8 8 13 2 10 17 17 8 11 ...  
## $ Ataque-Exc : num [1:264] 54 53 58 43 24 47 44 57 35 43 ...  
## $ Ataque-ExcPorc : num [1:264] 0.3 0.4 0.37 0.32 0.24 0.48 0.3 0.34 0.33 0.31 ...  
## $ Ataque-Efic : num [1:264] 0.19 0.28 0.2 0.16 0.03 0.31 0.05 0.15 0.16 0.13 ...  
## $ Bloqueo-Red : num [1:264] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Bloqueo-Pts : num [1:264] 11 12 14 9 1 5 12 14 5 9 ...  
## $ Bloqueo-Puntos por set: num [1:264] 2.2 3 2.8 2.3 0.3 1.7 2.4 2.8 1.7 2.3 ...  
## $ Ganado/Perdido : num [1:264] 0 1 0 0 0 1 0 0 0 0 ...

Primero cambiamos la variable *Ganado/Perdido* a una variable dicotómica de tipo factor con valores 0 y 1 correspondientes a si el equipo ha perdido o ha ganado el partido.

partidos2021$`Ganado/Perdido` = as.factor(partidos2021$`Ganado/Perdido`)  
str(partidos2021)

## tibble [264 x 27] (S3: tbl\_df/tbl/data.frame)  
## $ Equipo : chr [1:264] "Cajasol Juvasa" "Cajasol Juvasa" "Cajasol Juvasa" "Cajasol Juvasa" ...  
## $ Sets jugados : num [1:264] 5 4 5 4 3 3 5 5 3 4 ...  
## $ Tot : num [1:264] 71 68 79 58 27 64 64 75 42 59 ...  
## $ BP : num [1:264] 27 29 37 22 11 40 25 33 10 25 ...  
## $ G : num [1:264] 44 39 42 36 16 24 39 42 32 34 ...  
## $ G-P : num [1:264] 30 40 39 20 -10 37 7 23 11 10 ...  
## $ Saque-Tot : num [1:264] 107 95 102 89 42 74 81 100 50 82 ...  
## $ Saque-Pts : num [1:264] 6 3 7 6 2 12 8 4 2 7 ...  
## $ Saque-Err : num [1:264] 13 9 11 11 3 9 7 14 7 14 ...  
## $ Saque-Pts por set : num [1:264] 1.2 0.8 1.4 1.5 0.7 4 1.6 0.8 0.7 1.8 ...  
## $ Saque-Efic : num [1:264] -0.07 -0.06 -0.04 -0.06 -0.02 0.04 0.01 -0.1 -0.1 -0.09 ...  
## $ Recep-Tot : num [1:264] 100 80 91 89 67 49 104 89 74 84 ...  
## $ Recep-Err : num [1:264] 9 3 2 6 13 1 13 6 6 10 ...  
## $ Recep-Neg : num [1:264] 17 34 13 29 12 13 47 24 36 10 ...  
## $ Recep-Exc : num [1:264] 61 32 61 23 14 20 24 45 16 53 ...  
## $ Recep-ExcPorc : num [1:264] 0.61 0.4 0.67 0.26 0.21 0.41 0.23 0.51 0.22 0.63 ...  
## $ Recep-Efic : num [1:264] 0.52 0.36 0.65 0.19 0.01 0.39 0.11 0.44 0.14 0.51 ...  
## $ Ataque-Tot : num [1:264] 182 134 155 136 98 98 147 169 106 137 ...  
## $ Ataque-Err : num [1:264] 10 8 19 8 19 7 20 15 10 14 ...  
## $ Ataque-Blo : num [1:264] 9 8 8 13 2 10 17 17 8 11 ...  
## $ Ataque-Exc : num [1:264] 54 53 58 43 24 47 44 57 35 43 ...  
## $ Ataque-ExcPorc : num [1:264] 0.3 0.4 0.37 0.32 0.24 0.48 0.3 0.34 0.33 0.31 ...  
## $ Ataque-Efic : num [1:264] 0.19 0.28 0.2 0.16 0.03 0.31 0.05 0.15 0.16 0.13 ...  
## $ Bloqueo-Red : num [1:264] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Bloqueo-Pts : num [1:264] 11 12 14 9 1 5 12 14 5 9 ...  
## $ Bloqueo-Puntos por set: num [1:264] 2.2 3 2.8 2.3 0.3 1.7 2.4 2.8 1.7 2.3 ...  
## $ Ganado/Perdido : Factor w/ 2 levels "0","1": 1 2 1 1 1 2 1 1 1 1 ...

dim(partidos2021)

## [1] 264 27

summary(partidos2021)

## Equipo Sets jugados Tot BP   
## Length:264 Min. :3.000 Min. :24.00 Min. : 5.00   
## Class :character 1st Qu.:3.000 1st Qu.:52.00 1st Qu.:19.00   
## Mode :character Median :4.000 Median :60.00 Median :26.00   
## Mean :3.818 Mean :60.41 Mean :24.85   
## 3rd Qu.:4.250 3rd Qu.:73.00 3rd Qu.:31.00   
## Max. :5.000 Max. :92.00 Max. :44.00   
## G G-P Saque-Tot Saque-Pts   
## Min. :16.00 Min. :-10.00 Min. : 42.00 Min. : 0.00   
## 1st Qu.:28.00 1st Qu.: 17.00 1st Qu.: 73.00 1st Qu.: 3.00   
## Median :35.00 Median : 30.00 Median : 82.00 Median : 4.00   
## Mean :35.55 Mean : 26.35 Mean : 83.02 Mean : 4.75   
## 3rd Qu.:42.00 3rd Qu.: 37.00 3rd Qu.: 98.00 3rd Qu.: 6.00   
## Max. :63.00 Max. : 57.00 Max. :117.00 Max. :13.00   
## Saque-Err Saque-Pts por set Saque-Efic Recep-Tot   
## Min. : 0.000 Min. :0.00 Min. :-0.170 Min. : 37.00   
## 1st Qu.: 6.000 1st Qu.:0.80 1st Qu.:-0.090 1st Qu.: 62.75   
## Median : 8.000 Median :1.10 Median :-0.045 Median : 73.50   
## Mean : 8.746 Mean :1.27 Mean :-0.050 Mean : 74.24   
## 3rd Qu.:11.000 3rd Qu.:1.70 3rd Qu.:-0.020 3rd Qu.: 88.25   
## Max. :20.000 Max. :4.30 Max. : 0.100 Max. :108.00   
## Recep-Err Recep-Neg Recep-Exc Recep-ExcPorc   
## Min. : 0.000 Min. : 3.00 Min. : 5.00 Min. :0.0800   
## 1st Qu.: 3.000 1st Qu.:15.00 1st Qu.:20.00 1st Qu.:0.3000   
## Median : 4.000 Median :21.00 Median :26.00 Median :0.3650   
## Mean : 4.742 Mean :21.28 Mean :28.45 Mean :0.3849   
## 3rd Qu.: 6.000 3rd Qu.:27.00 3rd Qu.:34.00 3rd Qu.:0.4700   
## Max. :13.000 Max. :47.00 Max. :63.00 Max. :0.7100   
## Recep-Efic Ataque-Tot Ataque-Err Ataque-Blo   
## Min. :0.000 Min. : 73.0 Min. : 1.00 Min. : 1.000   
## 1st Qu.:0.240 1st Qu.:104.0 1st Qu.: 8.00 1st Qu.: 6.750   
## Median :0.305 Median :126.5 Median :11.00 Median : 9.000   
## Mean :0.321 Mean :130.0 Mean :11.44 Mean : 9.129   
## 3rd Qu.:0.400 3rd Qu.:155.0 3rd Qu.:15.00 3rd Qu.:11.000   
## Max. :0.670 Max. :214.0 Max. :24.00 Max. :26.000   
## Ataque-Exc Ataque-ExcPorc Ataque-Efic Bloqueo-Red   
## Min. :22.00 Min. :0.2200 Min. :0.0000 Min. :0.00000   
## 1st Qu.:38.00 1st Qu.:0.3200 1st Qu.:0.1500 1st Qu.:0.00000   
## Median :45.00 Median :0.3600 Median :0.2000 Median :0.00000   
## Mean :46.53 Mean :0.3617 Mean :0.2029 Mean :0.02652   
## 3rd Qu.:56.00 3rd Qu.:0.4000 3rd Qu.:0.2525 3rd Qu.:0.00000   
## Max. :74.00 Max. :0.5500 Max. :0.4300 Max. :2.00000   
## Bloqueo-Pts Bloqueo-Puntos por set Ganado/Perdido  
## Min. : 1.000 Min. :0.30 0:133   
## 1st Qu.: 6.750 1st Qu.:1.80 1:131   
## Median : 9.000 Median :2.30   
## Mean : 9.133 Mean :2.42   
## 3rd Qu.:11.000 3rd Qu.:3.00   
## Max. :26.000 Max. :5.70

## Estudio de las variables

Finalmente, tenemos una base de datos con las estadísticas correspondientes a los partidos de la fase regular en los que participaron los 12 equipos de la liga. Está compuesta por 264 registros con 27 variables. Las variables con las que se ha trabajado en este estudio son las siguientes:

* Variables cuantitativas discretas
  + Sets jugados
  + Tot (puntos totales ganados en el partido)
  + BP
  + G
  + G-P
  + Saque-Tot
  + Saque-Pts
  + Saque-Err
  + Recep-Tot
  + Recep-Err
  + Recep-Neg
  + Recep-Exc
  + Ataque-Tot
  + Ataque-Err
  + Ataque-Blo
  + Ataque-Exc
  + Bloqueo-Red
  + Bloqueo-Pts
* Variables cuantitativas continuas
  + Saque-Pts por set
  + Saque-Efic
  + Recep-Exc%: porcentaje de recepciones perfectas con respecto al total.
  + Recep-Efic: diferencia entre el número de recepciones perfectas y el número de recepciones falladas con respecto al total de recepciones en porcentaje.
  + Ataque-Exc%: porcentaje de ataques perfectos.
  + Ataque-Efic: diferencia entre el número de ataques perfectos y el número de ataques fallados y bloqueados con respecto al total de recepciones en porcentaje.
  + Bloqueo-Pts por set
* Variables cualitativas discretas
  + Equipo
  + Ganado/Perdido

# VARIABLES SELECCIONADAS

dat = partidos2021[,c(1:2,4:5,7:9,12:15,18:21,24:25,27)]  
str(dat)

## tibble [264 x 18] (S3: tbl\_df/tbl/data.frame)  
## $ Equipo : chr [1:264] "Cajasol Juvasa" "Cajasol Juvasa" "Cajasol Juvasa" "Cajasol Juvasa" ...  
## $ Sets jugados : num [1:264] 5 4 5 4 3 3 5 5 3 4 ...  
## $ BP : num [1:264] 27 29 37 22 11 40 25 33 10 25 ...  
## $ G : num [1:264] 44 39 42 36 16 24 39 42 32 34 ...  
## $ Saque-Tot : num [1:264] 107 95 102 89 42 74 81 100 50 82 ...  
## $ Saque-Pts : num [1:264] 6 3 7 6 2 12 8 4 2 7 ...  
## $ Saque-Err : num [1:264] 13 9 11 11 3 9 7 14 7 14 ...  
## $ Recep-Tot : num [1:264] 100 80 91 89 67 49 104 89 74 84 ...  
## $ Recep-Err : num [1:264] 9 3 2 6 13 1 13 6 6 10 ...  
## $ Recep-Neg : num [1:264] 17 34 13 29 12 13 47 24 36 10 ...  
## $ Recep-Exc : num [1:264] 61 32 61 23 14 20 24 45 16 53 ...  
## $ Ataque-Tot : num [1:264] 182 134 155 136 98 98 147 169 106 137 ...  
## $ Ataque-Err : num [1:264] 10 8 19 8 19 7 20 15 10 14 ...  
## $ Ataque-Blo : num [1:264] 9 8 8 13 2 10 17 17 8 11 ...  
## $ Ataque-Exc : num [1:264] 54 53 58 43 24 47 44 57 35 43 ...  
## $ Bloqueo-Red : num [1:264] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Bloqueo-Pts : num [1:264] 11 12 14 9 1 5 12 14 5 9 ...  
## $ Ganado/Perdido: Factor w/ 2 levels "0","1": 1 2 1 1 1 2 1 1 1 1 ...

### Gráficos y análisis de las variables

#### Boxplot

library(ggplot2)  
library(dplyr)

##   
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

library(tidyverse)

## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --

## v tibble 3.1.5 v purrr 0.3.4  
## v tidyr 1.1.4 v stringr 1.4.0  
## v readr 2.0.2 v forcats 0.5.1

## -- Conflicts ------------------------------------------ tidyverse\_conflicts() --  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag() masks stats::lag()

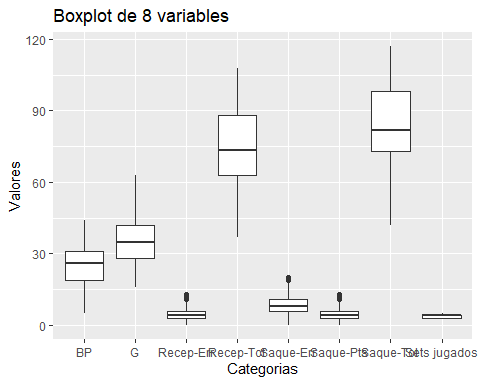
# CAMBIAMOS A FORMATO LARGO PARA HACER BOXPLOT DE LAS VARIABLES  
partidos\_boxplot1 = dat[,c(2:9)] %>%   
 pivot\_longer(names\_to = "Variables",  
 values\_to = "Valores", cols=everything())  
head(partidos\_boxplot1)

## # A tibble: 6 x 2  
## Variables Valores  
## <chr> <dbl>  
## 1 Sets jugados 5  
## 2 BP 27  
## 3 G 44  
## 4 Saque-Tot 107  
## 5 Saque-Pts 6  
## 6 Saque-Err 13

partidos\_boxplot2 = dat[,c(10:17)] %>%   
 pivot\_longer(names\_to = "Variables",  
 values\_to = "Valores", cols=everything())  
head(partidos\_boxplot2)

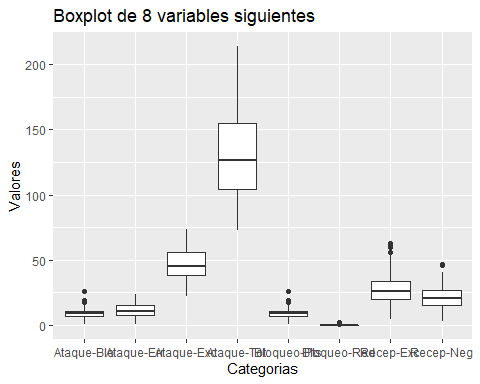
## # A tibble: 6 x 2  
## Variables Valores  
## <chr> <dbl>  
## 1 Recep-Neg 17  
## 2 Recep-Exc 61  
## 3 Ataque-Tot 182  
## 4 Ataque-Err 10  
## 5 Ataque-Blo 9  
## 6 Ataque-Exc 54

partidos\_boxplot1 %>%   
 ggplot(aes(x=`Variables` , y=Valores)) +  
 geom\_boxplot() +  
 labs(   
 title="Boxplot de 8 variables",  
 x="Categorias",  
 y="Valores")



Variables cuantitativas continuas

partidos\_boxplot2 %>%   
 ggplot(aes(x=Variables , y=Valores)) +  
 geom\_boxplot() +  
 labs(   
 title="Boxplot de 8 variables siguientes",  
 x="Categorias",  
 y="Valores")



Para ambos análisis podemos encontrar variables que presentan valores ‘outliers’, los cuales podrían afectar a nuestro estudio.

#### Matriz varianzas y correlaciones

Analizamos ahora la matriz de varianzas/covarianzas y la matriz de correlaciones para ver qué variables pueden verse afectadas por los valores de otras.

var(dat[,c(2:17)])

## Sets jugados BP G Saque-Tot Saque-Pts  
## Sets jugados 0.65122710 3.27341860 6.1161424 12.9989630 0.54372624  
## BP 3.27341860 65.66250432 30.3709817 113.1505358 14.01615970  
## G 6.11614241 30.37098168 86.1188501 141.4022353 3.84220532  
## Saque-Tot 12.99896301 113.15053578 141.4022353 340.5549026 20.19011407  
## Saque-Pts 0.54372624 14.01615970 3.8422053 20.1901141 7.56463878  
## Saque-Err 1.31489803 6.62016073 15.3386047 27.6122249 1.52186312  
## Recep-Tot 11.70203941 18.57587280 126.4775896 200.7567692 0.01520913  
## Recep-Err 0.55375043 -3.12184583 2.0745478 1.3879479 -0.78707224  
## Recep-Neg 2.94400277 -5.28218977 27.2267254 35.2581519 -1.63403042  
## Recep-Exc 5.59557553 27.10106291 61.1604159 115.5026501 5.21958175  
## Ataque-Tot 20.90183201 105.16786208 234.6176691 445.3877751 10.97433460  
## Ataque-Err 1.74179053 1.55565157 17.5773707 25.3773476 -0.78326996  
## Ataque-Blo 1.23263049 0.46776702 12.1718516 17.9067865 -0.02091255  
## Ataque-Exc 7.60559972 65.05526270 98.2742539 196.9273534 8.50855513  
## Bloqueo-Red -0.01797442 -0.09112513 -0.2352518 -0.3578177 -0.01235741  
## Bloqueo-Pts 1.23712409 16.95502074 14.3446538 37.4048277 1.78231939  
## Saque-Err Recep-Tot Recep-Err Recep-Neg Recep-Exc  
## Sets jugados 1.31489803 11.70203941 0.55375043 2.9440028 5.5955755  
## BP 6.62016073 18.57587280 -3.12184583 -5.2821898 27.1010629  
## G 15.33860468 126.47758958 2.07454776 27.2267254 61.1604159  
## Saque-Tot 27.61222491 200.75676921 1.38794792 35.2581519 115.5026501  
## Saque-Pts 1.52186312 0.01520913 -0.78707224 -1.6340304 5.2195817  
## Saque-Err 13.41443427 25.17962899 1.21955294 6.8955381 13.1642614  
## Recep-Tot 25.17962899 299.49994239 18.89918193 88.2026731 113.3808042  
## Recep-Err 1.21955294 18.89918193 7.59880171 7.2273879 4.4131236  
## Recep-Neg 6.89553808 88.20267312 7.22738795 68.9460623 1.7380027  
## Recep-Exc 13.16426144 113.38080424 4.41312363 1.7380027 127.6553606  
## Ataque-Tot 34.24811326 448.86599839 10.58272842 93.2955266 214.6674876  
## Ataque-Err 1.18418021 49.39877866 1.52045166 13.6575066 15.9456735  
## Ataque-Blo 2.15448208 35.28424934 1.79755732 12.0859258 12.8732861  
## Ataque-Exc 18.32424530 129.11141837 -0.30112916 19.6409293 73.6438962  
## Bloqueo-Red -0.08069766 -0.59200369 -0.05778315 -0.1556487 -0.3427958  
## Bloqueo-Pts 2.10981968 15.82705381 0.02287130 3.9061672 9.3734733  
## Ataque-Tot Ataque-Err Ataque-Blo Ataque-Exc Bloqueo-Red  
## Sets jugados 20.9018320 1.7417905 1.23263049 7.6055997 -0.01797442  
## BP 105.1678621 1.5556516 0.46776702 65.0552627 -0.09112513  
## G 234.6176691 17.5773707 12.17185160 98.2742539 -0.23525176  
## Saque-Tot 445.3877751 25.3773476 17.90678650 196.9273534 -0.35781772  
## Saque-Pts 10.9743346 -0.7832700 -0.02091255 8.5085551 -0.01235741  
## Saque-Err 34.2481133 1.1841802 2.15448208 18.3242453 -0.08069766  
## Recep-Tot 448.8659984 49.3987787 35.28424934 129.1114184 -0.59200369  
## Recep-Err 10.5827284 1.5204517 1.79755732 -0.3011292 -0.05778315  
## Recep-Neg 93.2955266 13.6575066 12.08592580 19.6409293 -0.15564869  
## Recep-Exc 214.6674876 15.9456735 12.87328609 73.6438962 -0.34279583  
## Ataque-Tot 974.1939019 87.8348312 52.72194377 293.1919144 -0.78337078  
## Ataque-Err 87.8348312 20.5514460 4.64281599 18.8590275 -0.10675193  
## Ataque-Blo 52.7219438 4.6428160 13.75521373 12.1448612 -0.03764835  
## Ataque-Exc 293.1919144 18.8590275 12.14486116 138.9650737 -0.28397569  
## Bloqueo-Red -0.7833708 -0.1067519 -0.03764835 -0.2839757 0.04111937  
## Bloqueo-Pts 35.4747811 1.0517917 0.49997119 15.8120607 -0.03014460  
## Bloqueo-Pts  
## Sets jugados 1.2371241  
## BP 16.9550207  
## G 14.3446538  
## Saque-Tot 37.4048277  
## Saque-Pts 1.7823194  
## Saque-Err 2.1098197  
## Recep-Tot 15.8270538  
## Recep-Err 0.0228713  
## Recep-Neg 3.9061672  
## Recep-Exc 9.3734733  
## Ataque-Tot 35.4747811  
## Ataque-Err 1.0517917  
## Ataque-Blo 0.4999712  
## Ataque-Exc 15.8120607  
## Bloqueo-Red -0.0301446  
## Bloqueo-Pts 13.7199994

cor = cor(dat[,2:17])  
round(cor,3)

## Sets jugados BP G Saque-Tot Saque-Pts Saque-Err Recep-Tot  
## Sets jugados 1.000 0.501 0.817 0.873 0.245 0.445 0.838  
## BP 0.501 1.000 0.404 0.757 0.629 0.223 0.132  
## G 0.817 0.404 1.000 0.826 0.151 0.451 0.788  
## Saque-Tot 0.873 0.757 0.826 1.000 0.398 0.409 0.629  
## Saque-Pts 0.245 0.629 0.151 0.398 1.000 0.151 0.000  
## Saque-Err 0.445 0.223 0.451 0.409 0.151 1.000 0.397  
## Recep-Tot 0.838 0.132 0.788 0.629 0.000 0.397 1.000  
## Recep-Err 0.249 -0.140 0.081 0.027 -0.104 0.121 0.396  
## Recep-Neg 0.439 -0.079 0.353 0.230 -0.072 0.227 0.614  
## Recep-Exc 0.614 0.296 0.583 0.554 0.168 0.318 0.580  
## Ataque-Tot 0.830 0.416 0.810 0.773 0.128 0.300 0.831  
## Ataque-Err 0.476 0.042 0.418 0.303 -0.063 0.071 0.630  
## Ataque-Blo 0.412 0.016 0.354 0.262 -0.002 0.159 0.550  
## Ataque-Exc 0.799 0.681 0.898 0.905 0.262 0.424 0.633  
## Bloqueo-Red -0.110 -0.055 -0.125 -0.096 -0.022 -0.109 -0.169  
## Bloqueo-Pts 0.414 0.565 0.417 0.547 0.175 0.156 0.247  
## Recep-Err Recep-Neg Recep-Exc Ataque-Tot Ataque-Err Ataque-Blo  
## Sets jugados 0.249 0.439 0.614 0.830 0.476 0.412  
## BP -0.140 -0.079 0.296 0.416 0.042 0.016  
## G 0.081 0.353 0.583 0.810 0.418 0.354  
## Saque-Tot 0.027 0.230 0.554 0.773 0.303 0.262  
## Saque-Pts -0.104 -0.072 0.168 0.128 -0.063 -0.002  
## Saque-Err 0.121 0.227 0.318 0.300 0.071 0.159  
## Recep-Tot 0.396 0.614 0.580 0.831 0.630 0.550  
## Recep-Err 1.000 0.316 0.142 0.123 0.122 0.176  
## Recep-Neg 0.316 1.000 0.019 0.360 0.363 0.392  
## Recep-Exc 0.142 0.019 1.000 0.609 0.311 0.307  
## Ataque-Tot 0.123 0.360 0.609 1.000 0.621 0.455  
## Ataque-Err 0.122 0.363 0.311 0.621 1.000 0.276  
## Ataque-Blo 0.176 0.392 0.307 0.455 0.276 1.000  
## Ataque-Exc -0.009 0.201 0.553 0.797 0.353 0.278  
## Bloqueo-Red -0.103 -0.092 -0.150 -0.124 -0.116 -0.050  
## Bloqueo-Pts 0.002 0.127 0.224 0.307 0.063 0.036  
## Ataque-Exc Bloqueo-Red Bloqueo-Pts  
## Sets jugados 0.799 -0.110 0.414  
## BP 0.681 -0.055 0.565  
## G 0.898 -0.125 0.417  
## Saque-Tot 0.905 -0.096 0.547  
## Saque-Pts 0.262 -0.022 0.175  
## Saque-Err 0.424 -0.109 0.156  
## Recep-Tot 0.633 -0.169 0.247  
## Recep-Err -0.009 -0.103 0.002  
## Recep-Neg 0.201 -0.092 0.127  
## Recep-Exc 0.553 -0.150 0.224  
## Ataque-Tot 0.797 -0.124 0.307  
## Ataque-Err 0.353 -0.116 0.063  
## Ataque-Blo 0.278 -0.050 0.036  
## Ataque-Exc 1.000 -0.119 0.362  
## Bloqueo-Red -0.119 1.000 -0.040  
## Bloqueo-Pts 0.362 -0.040 1.000

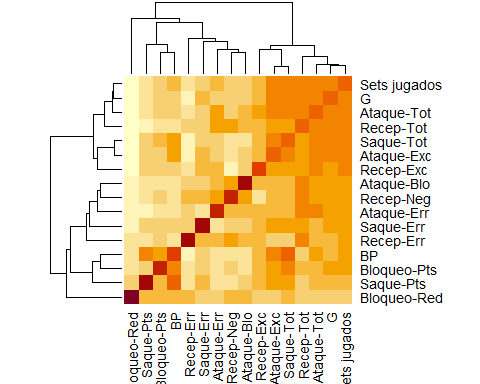
Para ver si hay variables explicativas que se encuentren muy correlacionadas realizamos el determinante de la matriz de correlaciones

det(cor)

## [1] 1.083172e-10

Tiene un valor muy próximo a cero luego eso significa que hay variables en las que existe una alta correlación entre ellas.

heatmap(cor)



# variables mas correlacionadas  
variables = colnames(dat[,2:17])  
correlacionMax=0.85  
corAltas = matrix (ncol = 3)  
for (i in 1:dim(cor)[1]){  
 for (j in 1:dim(cor)[2]){  
 if (abs(cor[i,j])>correlacionMax && cor[i,j]<1){  
 corAltas = rbind(corAltas, c(variables[i],variables[j],cor[i,j]))  
 }  
 }  
}  
corAltas[-1,]

## [,1] [,2] [,3]   
## [1,] "Sets jugados" "Saque-Tot" "0.872868673394135"  
## [2,] "G" "Ataque-Exc" "0.898333950757833"  
## [3,] "Saque-Tot" "Sets jugados" "0.872868673394135"  
## [4,] "Saque-Tot" "Ataque-Exc" "0.905231472292508"  
## [5,] "Ataque-Exc" "G" "0.898333950757833"  
## [6,] "Ataque-Exc" "Saque-Tot" "0.905231472292508"

Esto puede indicar que existe un problema de multicolinealidad, en el que hay variables que me aportan información similar, luego esto puede dar lugar a interpretaciones erróneas. Para ello puede ser de gran ayuda un análisis de componentes principales.

### Análisis de componentes principales

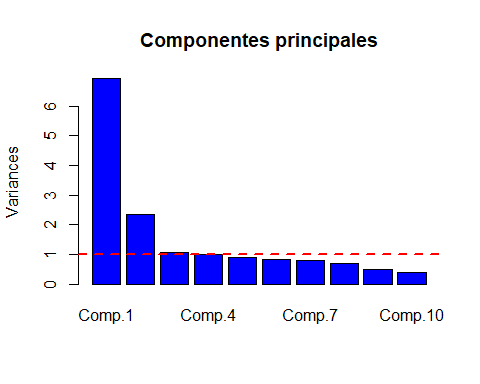
*Objetivo central del Análisis de Comp. Principales (ACP): reducir la dimensión de un conjunto de datos, descritos por un número elevado de variables aleatorias interrelacionadas entre sí, reteniendo tanto como sea posible la variación que presenta dicho conjunto de datos. Se trata de explicar la estructura de varianzas y covarianzas del conjunto de variables a través de otro conjunto de variables, con un cardinal considerablemente menor que el primero. Así se podrá reducir dimensión, además de interpretar los datos*

Su construcción no requiere supuesto de normalidad. No obstante, en poblaciones normales se pueden realizar tests de hipótesis y proporcionan interpretaciones útiles de los elipsoides de densidad constante.

acp = princomp(dat[,2:17], cor=TRUE) #cor=TRUE variables tipificadas ya que las escalas son muy distintas  
summary(acp)

## Importance of components:  
## Comp.1 Comp.2 Comp.3 Comp.4 Comp.5  
## Standard deviation 2.6325235 1.5296310 1.03395744 1.0001184 0.95042164  
## Proportion of Variance 0.4331362 0.1462357 0.06681675 0.0625148 0.05645633  
## Cumulative Proportion 0.4331362 0.5793719 0.64618867 0.7087035 0.76515980  
## Comp.6 Comp.7 Comp.8 Comp.9 Comp.10  
## Standard deviation 0.91695835 0.88924679 0.82810584 0.69344003 0.61037887  
## Proportion of Variance 0.05255079 0.04942249 0.04285995 0.03005369 0.02328515  
## Cumulative Proportion 0.81771059 0.86713308 0.90999304 0.94004673 0.96333188  
## Comp.11 Comp.12 Comp.13 Comp.14  
## Standard deviation 0.47510744 0.394715182 0.350767015 0.208918561  
## Proportion of Variance 0.01410794 0.009737505 0.007689844 0.002727935  
## Cumulative Proportion 0.97743982 0.987177325 0.994867168 0.997595104  
## Comp.15 Comp.16  
## Standard deviation 0.196129265 3.413810e-03  
## Proportion of Variance 0.002404168 7.283811e-07  
## Cumulative Proportion 0.999999272 1.000000e+00

# grafico de sedimentacion  
plot(acp, col="blue", main = "Componentes principales")  
abline(h=mean(eigen(cor)$values), lwd=2,lty=2, col="red")



resumen<- matrix(NA,nrow=length(acp$sdev),ncol=3)  
resumen[,1]<- acp$sdev^2 # eigen(cor)$values  
resumen[,2]<- 100\*resumen[,1]/sum(resumen[,1])  
resumen[,3]<- cumsum(resumen[,2])  
colnames(resumen)<- c("Autovalor","Porcentaje",  
 "Porcentaje acumulado")  
resumen

## Autovalor Porcentaje Porcentaje acumulado  
## [1,] 6.9301797922 4.331362e+01 43.31362  
## [2,] 2.3397708855 1.462357e+01 57.93719  
## [3,] 1.0690679921 6.681675e+00 64.61887  
## [4,] 1.0002368635 6.251480e+00 70.87035  
## [5,] 0.9033013024 5.645633e+00 76.51598  
## [6,] 0.8408126202 5.255079e+00 81.77106  
## [7,] 0.7907598585 4.942249e+00 86.71331  
## [8,] 0.6857592794 4.285995e+00 90.99930  
## [9,] 0.4808590780 3.005369e+00 94.00467  
## [10,] 0.3725623668 2.328515e+00 96.33319  
## [11,] 0.2257270795 1.410794e+00 97.74398  
## [12,] 0.1558000753 9.737505e-01 98.71773  
## [13,] 0.1230374989 7.689844e-01 99.48672  
## [14,] 0.0436469651 2.727935e-01 99.75951  
## [15,] 0.0384666884 2.404168e-01 99.99993  
## [16,] 0.0000116541 7.283811e-05 100.00000

Hasta la 8 tenemos un 90% de la variabilidad explicada

Contraste de hipótesis para seleccionar el número de componentes principales (bajo hipótesis de normalidad multivariante)

apply(dat[,2:17],2 ,shapiro.test)

## $`Sets jugados`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.7787, p-value < 2.2e-16  
##   
##   
## $BP  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.97866, p-value = 0.0005389  
##   
##   
## $G  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.98416, p-value = 0.005022  
##   
##   
## $`Saque-Tot`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.9659, p-value = 6.425e-06  
##   
##   
## $`Saque-Pts`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.93232, p-value = 1.249e-09  
##   
##   
## $`Saque-Err`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.98398, p-value = 0.004654  
##   
##   
## $`Recep-Tot`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.97564, p-value = 0.0001732  
##   
##   
## $`Recep-Err`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.93206, p-value = 1.182e-09  
##   
##   
## $`Recep-Neg`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.98518, p-value = 0.00778  
##   
##   
## $`Recep-Exc`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.94851, p-value = 5.077e-08  
##   
##   
## $`Ataque-Tot`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.97049, p-value = 2.841e-05  
##   
##   
## $`Ataque-Err`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.98592, p-value = 0.01075  
##   
##   
## $`Ataque-Blo`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.97006, p-value = 2.464e-05  
##   
##   
## $`Ataque-Exc`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.98453, p-value = 0.005889  
##   
##   
## $`Bloqueo-Red`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.11135, p-value < 2.2e-16  
##   
##   
## $`Bloqueo-Pts`  
##   
## Shapiro-Wilk normality test  
##   
## data: newX[, i]  
## W = 0.96992, p-value = 2.354e-05

Se rechaza normalidad univariante para todas las variables a un nivel de signficación del 5%. No tenemos normalidad multivariante

Coeficientes y correlaciones de las C.P

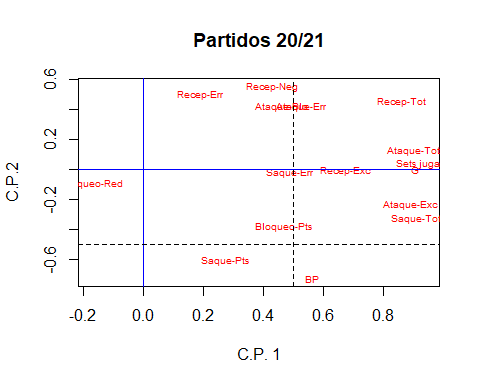
loadings(acp)[,1:8] #Coeficientes que definen cada combinación lineal, si cogemos las 8 c.p

## Comp.1 Comp.2 Comp.3 Comp.4 Comp.5  
## Sets jugados 0.35781958 0.0247369437 0.034840461 0.07177652 0.018170065  
## BP 0.21421512 -0.4765563581 0.076818148 0.08394368 -0.151123705  
## G 0.34453052 -0.0005926649 -0.087737508 -0.02447836 0.056579520  
## Saque-Tot 0.34478616 -0.2164500054 -0.004377820 0.05795316 -0.032871041  
## Saque-Pts 0.10379912 -0.3984568970 0.221263612 0.06146848 0.077725009  
## Saque-Err 0.18537738 -0.0158311618 0.412740806 -0.03760540 0.534005925  
## Recep-Tot 0.32770118 0.2948363235 0.007947023 0.02112818 0.002271121  
## Recep-Err 0.07201352 0.3236687320 0.545940490 0.12935654 0.013087615  
## Recep-Neg 0.16293861 0.3601411066 0.228859954 0.39126206 -0.242951641  
## Recep-Exc 0.25568815 -0.0085143502 -0.085810435 -0.35417889 0.305910894  
## Ataque-Tot 0.34275147 0.0794798972 -0.237868359 -0.06695848 -0.044309767  
## Ataque-Err 0.20030884 0.2712809354 -0.372713606 -0.12289449 -0.296596569  
## Ataque-Blo 0.17576997 0.2714357567 -0.072106518 0.12526185 0.185732313  
## Ataque-Exc 0.33813769 -0.1566606892 -0.115681293 -0.07143941 0.069016678  
## Bloqueo-Red -0.06534606 -0.0645296181 -0.413419584 0.74182263 0.425663746  
## Bloqueo-Pts 0.17820019 -0.2503082318 0.151680536 0.30374603 -0.467097961  
## Comp.6 Comp.7 Comp.8  
## Sets jugados 0.003210962 0.0652417368 0.065064939  
## BP 0.153615920 0.0399770872 0.015937915  
## G -0.210359171 -0.0905725043 -0.018092819  
## Saque-Tot -0.044097856 0.0054324414 0.004236951  
## Saque-Pts 0.673323852 -0.0313516262 0.243072360  
## Saque-Err -0.307952174 -0.3999709062 0.161850510  
## Recep-Tot 0.003902568 0.0365828347 0.039642149  
## Recep-Err 0.053163849 0.6310163839 0.166304047  
## Recep-Neg 0.097131650 -0.3967403480 0.094801143  
## Recep-Exc -0.016583591 0.4164024048 -0.170246157  
## Ataque-Tot 0.038383931 0.0394644389 0.042101298  
## Ataque-Err 0.134884506 -0.0000447264 0.450644191  
## Ataque-Blo 0.449100510 -0.1239409910 -0.698281687  
## Ataque-Exc -0.103236057 -0.0834106959 0.049443319  
## Bloqueo-Red -0.072203216 0.2207051232 0.161583594  
## Bloqueo-Pts -0.363615285 0.1484993346 -0.348832349

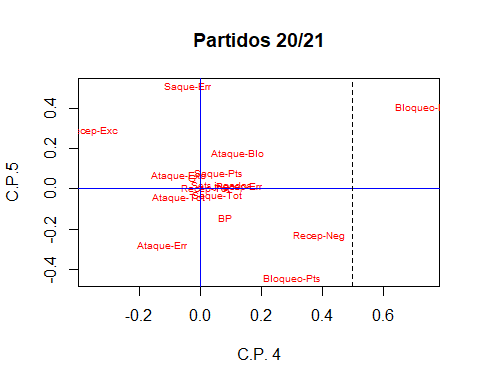
#para calcular las correlaciones entre las   
#variables y las componentes  
cor\_vc<-loadings(acp)%\*%diag(acp$sdev) #coeficientes\*desvtipica  
cor\_vc[,1:8] # par las 8 comp. principales

## [,1] [,2] [,3] [,4] [,5]  
## Sets jugados 0.9419684 0.0378383950 0.036023554 0.07178502 0.017269223  
## BP 0.5639263 -0.7289553614 0.079426696 0.08395362 -0.143631240  
## G 0.9069847 -0.0009065586 -0.090716850 -0.02448126 0.053774400  
## Saque-Tot 0.9076576 -0.3310886303 -0.004526480 0.05796002 -0.031241349  
## Saque-Pts 0.2732536 -0.6094920075 0.228777159 0.06147576 0.073871531  
## Saque-Err 0.4880103 -0.0242158352 0.426756428 -0.03760986 0.507530789  
## Recep-Tot 0.8626810 0.4509907697 0.008216884 0.02113068 0.002158523  
## Recep-Err 0.1895773 0.4950937145 0.564479232 0.12937186 0.012438752  
## Recep-Neg 0.4289397 0.5508829880 0.236631453 0.39130840 -0.230906498  
## Recep-Exc 0.6731051 -0.0130238136 -0.088724338 -0.35422084 0.290744335  
## Ataque-Tot 0.9023013 0.1215749118 -0.245945760 -0.06696641 -0.042112961  
## Ataque-Err 0.5273177 0.4149597187 -0.385370006 -0.12290904 -0.281891799  
## Ataque-Blo 0.4627186 0.4151965382 -0.074555071 0.12527668 0.176524010  
## Ataque-Exc 0.8901554 -0.2396330411 -0.119609534 -0.07144787 0.065594944  
## Bloqueo-Red -0.1720250 -0.0987065019 -0.427458255 0.74191048 0.404560037  
## Bloqueo-Pts 0.4691162 -0.3828792219 0.156831219 0.30378200 -0.443940012  
## [,6] [,7] [,8]  
## Sets jugados 0.002944318 0.0580160052 0.053880656  
## BP 0.140859401 0.0355494965 0.013198281  
## G -0.192890599 -0.0805413090 -0.014982769  
## Saque-Tot -0.040435897 0.0048307811 0.003508644  
## Saque-Pts 0.617409930 -0.0278793330 0.201289641  
## Saque-Err -0.282379318 -0.3556728455 0.134029352  
## Recep-Tot 0.003578492 0.0325311684 0.032827895  
## Recep-Err 0.048749035 0.5611292955 0.137717352  
## Recep-Neg 0.089065678 -0.3528000820 0.078505380  
## Recep-Exc -0.015206462 0.3702845030 -0.140981837  
## Ataque-Tot 0.035196466 0.0350936257 0.034864331  
## Ataque-Err 0.123683475 -0.0000397728 0.373181086  
## Ataque-Blo 0.411806464 -0.1102141287 -0.578251142  
## Ataque-Exc -0.094663165 -0.0741726939 0.040944301  
## Bloqueo-Red -0.066207342 0.1962613230 0.133808318  
## Bloqueo-Pts -0.333420073 0.1320525570 -0.288870104

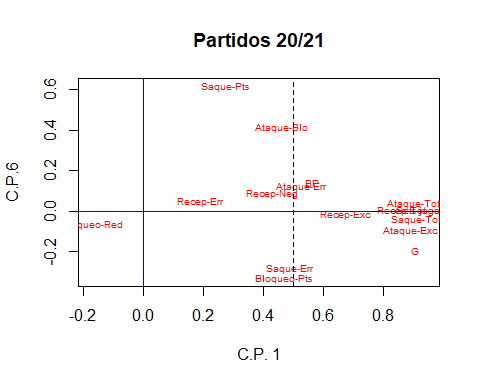
#Para ayudar a interpretar las CP:  
plot(cor\_vc[,1:2],type="n",  
 main="Partidos 20/21",  
 xlab="C.P. 1",ylab="C.P.2")  
text(cor\_vc[,1:2],labels=rownames(cor\_vc),  
 col="red",cex=0.6)  
abline(h=0,v=0,lty=1,col="blue")  
abline(v=0.5,lty=2)  
abline(v=-0.5,lty=2)  
abline(h=-0.5,lty=2)



#Para ayudar a interpretar las CP:  
plot(cor\_vc[,4:5],type="n",  
 main="Partidos 20/21",  
 xlab="C.P. 4",ylab="C.P.5")  
text(cor\_vc[,4:5],labels=rownames(cor\_vc),  
 col="red",cex=0.6)  
abline(h=0,v=0,lty=1,col="blue")  
abline(v=0.5,lty=2)  
abline(v=-0.5,lty=2)  
abline(h=-0.5,lty=2)



#Para ayudar a interpretar las CP:  
plot(cor\_vc[,c(1,6)],type="n",  
 main="Partidos 20/21",  
 xlab="C.P. 1",ylab="C.P.6")  
text(cor\_vc[,c(1,6)],labels=rownames(cor\_vc),  
 col="red",cex=0.6)  
abline(h=0,v=0,lty=1,col="blue")  
abline(v=0.5,lty=2)  
abline(v=-0.5,lty=2)  
abline(h=-0.5,lty=2)



No se pueden interpretar bien las componentes principales, luego no nos son útiles para el estudio.

## Modelos estadísticos (con las variables seleccionadas)

### Partición entrenamiento/test

n<- nrow(dat)  
indin<- 1:n  
nent<-ceiling(0.7\*n)  
ntest<- n-nent  
set.seed(2468)  
indient<- sort(sample(indin,nent))  
inditest<- setdiff(indin,indient)  
datent<- dat[indient,]  
dattest<- dat[inditest,]  
  
head(dattest,10)

## # A tibble: 10 x 18  
## Equipo `Sets jugados` BP G `Saque-Tot` `Saque-Pts` `Saque-Err`  
## <chr> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 Cajasol Juvasa 3 15 33 62 2 10  
## 2 AD Algar Surm~ 5 31 50 107 4 9  
## 3 AD Algar Surm~ 5 28 40 108 4 8  
## 4 AD Algar Surm~ 4 19 47 96 5 6  
## 5 AD Algar Surm~ 4 16 40 80 4 15  
## 6 AD Algar Surm~ 4 26 40 89 7 12  
## 7 AD Algar Surm~ 4 25 36 86 2 10  
## 8 AD Algar Surm~ 3 9 26 56 4 4  
## 9 Arenal Emevé 3 14 26 67 3 9  
## 10 Arenal Emevé 5 29 55 101 6 9  
## # ... with 11 more variables: Recep-Tot <dbl>, Recep-Err <dbl>,  
## # Recep-Neg <dbl>, Recep-Exc <dbl>, Ataque-Tot <dbl>, Ataque-Err <dbl>,  
## # Ataque-Blo <dbl>, Ataque-Exc <dbl>, Bloqueo-Red <dbl>, Bloqueo-Pts <dbl>,  
## # Ganado/Perdido <fct>

### Regla simple de Bayes

library(e1071)   
modeloNB<- naiveBayes(`Ganado/Perdido` ~ ., data = datent[,2:18])  
modeloNB # para cada variable, Media [,1] y s.d [,2] en cada categoria de la variable objetivo

##   
## Naive Bayes Classifier for Discrete Predictors  
##   
## Call:  
## naiveBayes.default(x = X, y = Y, laplace = laplace)  
##   
## A-priori probabilities:  
## Y  
## 0 1   
## 0.4972973 0.5027027   
##   
## Conditional probabilities:  
## Sets jugados  
## Y [,1] [,2]  
## 0 3.782609 0.7959525  
## 1 3.795699 0.8413129  
##   
## BP  
## Y [,1] [,2]  
## 0 19.45652 7.319120  
## 1 30.03226 5.057177  
##   
## G  
## Y [,1] [,2]  
## 0 34.11957 9.402878  
## 1 35.98925 9.313962  
##   
## Saque-Tot  
## Y [,1] [,2]  
## 0 75.55435 19.39489  
## 1 88.76344 15.00246  
##   
## Saque-Pts  
## Y [,1] [,2]  
## 0 3.782609 2.479924  
## 1 5.752688 2.958613  
##   
## Saque-Err  
## Y [,1] [,2]  
## 0 9.076087 3.641138  
## 1 8.752688 3.963573  
##   
## Recep-Tot  
## Y [,1] [,2]  
## 0 79.77174 13.63101  
## 1 66.79570 18.54639  
##   
## Recep-Err  
## Y [,1] [,2]  
## 0 5.619565 2.732959  
## 1 3.537634 2.139480  
##   
## Recep-Neg  
## Y [,1] [,2]  
## 0 23.90217 8.180733  
## 1 17.52688 7.033447  
##   
## Recep-Exc  
## Y [,1] [,2]  
## 0 29.67391 11.77174  
## 1 28.51613 11.87856  
##   
## Ataque-Tot  
## Y [,1] [,2]  
## 0 129.4348 29.67676  
## 1 127.2581 30.37659  
##   
## Ataque-Err  
## Y [,1] [,2]  
## 0 12.50000 4.351329  
## 1 10.04301 4.216721  
##   
## Ataque-Blo  
## Y [,1] [,2]  
## 0 10.217391 3.893715  
## 1 7.677419 3.284222  
##   
## Ataque-Exc  
## Y [,1] [,2]  
## 0 41.78261 11.99526  
## 1 50.22581 10.23541  
##   
## Bloqueo-Red  
## Y [,1] [,2]  
## 0 0.02173913 0.2085144  
## 1 0.02150538 0.1458479  
##   
## Bloqueo-Pts  
## Y [,1] [,2]  
## 0 8.01087 3.242894  
## 1 10.05376 3.981931

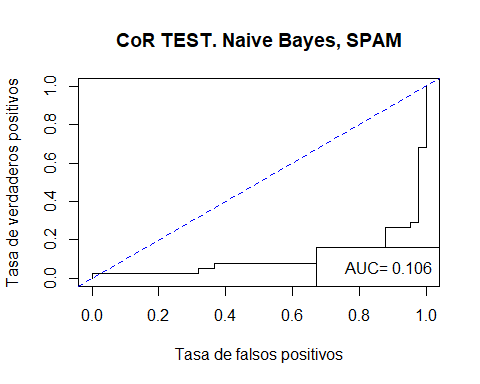
preditestNB<- predict(modeloNB,dattest)  
confutestNB<-table(dattest$`Ganado/Perdido`,preditestNB)  
confutestNB

## preditestNB  
## 0 1  
## 0 35 6  
## 1 6 32

AciertoNB=round(100\*mean(dattest$`Ganado/Perdido`==preditestNB),2)  
SensEspecNB=round(100\*diag(prop.table(confutestNB,1)),2)  
c(AciertoNB,SensEspecNB)

## 0 1   
## 84.81 85.37 84.21

library(ROCR)  
probabi1<- predict(modeloNB,dattest,  
 type="raw")[,1] #Prob. ganar partido  
prediobj<-prediction(probabi1,dattest$`Ganado/Perdido`)  
plot(performance(prediobj, "tpr","fpr"),  
 main="CoR TEST. Naive Bayes, SPAM",  
 xlab="Tasa de falsos positivos", ylab="Tasa de verdaderos positivos")  
abline(a=0,b=1,col="blue",lty=2)  
aucNB<- as.numeric(performance(prediobj,"auc")@y.values)  
legend("bottomright",legend=paste("AUC=",round(aucNB,3)))



Guardamos resultados

Resul=c(Acierto=AciertoNB,AUC=aucNB,SensEspecNB)  
Resul

## Acierto AUC 0 1   
## 84.810000 0.105905 85.370000 84.210000

#### Otra libreria

detach("package:e1071")  
library(naivebayes)

## naivebayes 0.9.7 loaded

modeloNB2<- naive\_bayes(`Ganado/Perdido` ~ ., data = datent[,2:18],  
 usekernel=TRUE,kernel ="epanechnikov",bw="nrd0",  
 usepoisson=T)  
# podemos hacerlo por equipos  
# modeloNB2<- naive\_bayes(`Ganado/Perdido` ~ ., data = datent,  
# usekernel=TRUE,kernel ="epanechnikov",bw="nrd0",  
# usepoisson=T)  
  
#usekernel=TRUE permite estimar la funcion de densidad  
#mediante el metodo nucleo para variables numericas  
#utilizando la funcion density, por defecto nucleo gaussiano  
#y metodo nrd0 para estimar amplitud de ventana  
#usepoisson=TRUE permite estimar la funcion de probabilidad  
#mediante el ajuste de una ley Poisson para variables "integer"  
#por defecto estimadores maxima verosimilitud ver help(naive\_bayes)  
#y el documento intro\_naivebayes.pdf  
  
summary(modeloNB2)

##   
## ================================== Naive Bayes ==================================   
##   
## - Call: naive\_bayes.formula(formula = `Ganado/Perdido` ~ ., data = datent[, 2:18], usekernel = TRUE, usepoisson = T, kernel = "epanechnikov", bw = "nrd0")   
## - Laplace: 0   
## - Classes: 2   
## - Samples: 185   
## - Features: 16   
## - Conditional distributions:   
## - KDE: 16  
## - Prior probabilities:   
## - 0: 0.4973  
## - 1: 0.5027  
##   
## ---------------------------------------------------------------------------------

modeloNB2

##   
## ================================== Naive Bayes ==================================   
##   
## Call:   
## naive\_bayes.formula(formula = `Ganado/Perdido` ~ ., data = datent[,   
## 2:18], usekernel = TRUE, usepoisson = T, kernel = "epanechnikov",   
## bw = "nrd0")  
##   
## ---------------------------------------------------------------------------------   
##   
## Laplace smoothing: 0  
##   
## ---------------------------------------------------------------------------------   
##   
## A priori probabilities:   
##   
## 0 1   
## 0.4972973 0.5027027   
##   
## ---------------------------------------------------------------------------------   
##   
## Tables:   
##   
## ---------------------------------------------------------------------------------   
## ::: Sets jugados::0 (KDE)  
## ---------------------------------------------------------------------------------   
##   
## Call:  
## density.default(x = x, bw = "nrd0", kernel = "epanechnikov", na.rm = TRUE)  
##   
## Data: x (92 obs.); Bandwidth 'bw' = 0.2719  
##   
## x y   
## Min. :2.184 Min. :0.0000   
## 1st Qu.:3.092 1st Qu.:0.1948   
## Median :4.000 Median :0.2773   
## Mean :4.000 Mean :0.2751   
## 3rd Qu.:4.908 3rd Qu.:0.3855   
## Max. :5.816 Max. :0.5497   
##   
## ---------------------------------------------------------------------------------   
## ::: Sets jugados::1 (KDE)  
## ---------------------------------------------------------------------------------   
##   
## Call:  
## density.default(x = x, bw = "nrd0", kernel = "epanechnikov", na.rm = TRUE)  
##   
## Data: x (93 obs.); Bandwidth 'bw' = 0.3058  
##   
## x y   
## Min. :2.082 Min. :0.0000   
## 1st Qu.:3.041 1st Qu.:0.2148   
## Median :4.000 Median :0.2679   
## Mean :4.000 Mean :0.2605   
## 3rd Qu.:4.959 3rd Qu.:0.3382   
## Max. :5.918 Max. :0.5188   
##   
## ---------------------------------------------------------------------------------   
## ::: BP::0 (KDE)  
## ---------------------------------------------------------------------------------   
##   
## Call:  
## density.default(x = x, bw = "nrd0", kernel = "epanechnikov", na.rm = TRUE)  
##   
## Data: x (92 obs.); Bandwidth 'bw' = 2.667  
##   
## x y   
## Min. :-3 Min. :0.000000   
## 1st Qu.: 9 1st Qu.:0.002517   
## Median :21 Median :0.017964   
## Mean :21 Mean :0.020811   
## 3rd Qu.:33 3rd Qu.:0.035631   
## Max. :45 Max. :0.052230   
##   
## ---------------------------------------------------------------------------------   
## ::: BP::1 (KDE)  
## ---------------------------------------------------------------------------------   
##   
## Call:  
## density.default(x = x, bw = "nrd0", kernel = "epanechnikov", na.rm = TRUE)  
##   
## Data: x (93 obs.); Bandwidth 'bw' = 1.838  
##   
## x y   
## Min. :14.48 Min. :0.00000   
## 1st Qu.:23.24 1st Qu.:0.00289   
## Median :32.00 Median :0.02043   
## Mean :32.00 Mean :0.02852   
## 3rd Qu.:40.76 3rd Qu.:0.05481   
## Max. :49.52 Max. :0.07147   
##   
## ---------------------------------------------------------------------------------   
## ::: G::0 (KDE)  
## ---------------------------------------------------------------------------------   
##   
## Call:  
## density.default(x = x, bw = "nrd0", kernel = "epanechnikov", na.rm = TRUE)  
##   
## Data: x (92 obs.); Bandwidth 'bw' = 3.426  
##   
## x y   
## Min. : 5.723 Min. :0.000000   
## 1st Qu.:21.111 1st Qu.:0.002274   
## Median :36.500 Median :0.013584   
## Mean :36.500 Mean :0.016228   
## 3rd Qu.:51.889 3rd Qu.:0.031266   
## Max. :67.277 Max. :0.035294   
##   
## ---------------------------------------------------------------------------------   
## ::: G::1 (KDE)  
## ---------------------------------------------------------------------------------   
##   
## Call:  
## density.default(x = x, bw = "nrd0", kernel = "epanechnikov", na.rm = TRUE)  
##   
## Data: x (93 obs.); Bandwidth 'bw' = 3.386  
##   
## x y   
## Min. : 9.842 Min. :0.000000   
## 1st Qu.:24.921 1st Qu.:0.001848   
## Median :40.000 Median :0.015112   
## Mean :40.000 Mean :0.016564   
## 3rd Qu.:55.079 3rd Qu.:0.031518   
## Max. :70.158 Max. :0.037012   
##   
## ---------------------------------------------------------------------------------   
## ::: Saque-Tot::0 (KDE)  
## ---------------------------------------------------------------------------------   
##   
## Call:  
## density.default(x = x, bw = "nrd0", kernel = "epanechnikov", na.rm = TRUE)  
##   
## Data: x (92 obs.); Bandwidth 'bw' = 7.066  
##   
## x y   
## Min. : 20.8 Min. :0.000000   
## 1st Qu.: 48.9 1st Qu.:0.001607   
## Median : 77.0 Median :0.010710   
## Mean : 77.0 Mean :0.008888   
## 3rd Qu.:105.1 3rd Qu.:0.014545   
## Max. :133.2 Max. :0.017599   
##   
## ---------------------------------------------------------------------------------   
## ::: Saque-Tot::1 (KDE)  
## ---------------------------------------------------------------------------------   
##   
## Call:  
## density.default(x = x, bw = "nrd0", kernel = "epanechnikov", na.rm = TRUE)  
##   
## Data: x (93 obs.); Bandwidth 'bw' = 5.454  
##   
## x y   
## Min. : 56.64 Min. :0.000000   
## 1st Qu.: 75.32 1st Qu.:0.005492   
## Median : 94.00 Median :0.014447   
## Mean : 94.00 Mean :0.013370   
## 3rd Qu.:112.68 3rd Qu.:0.019303   
## Max. :131.36 Max. :0.028897   
##   
## ---------------------------------------------------------------------------------   
## ::: Saque-Pts::0 (KDE)  
## ---------------------------------------------------------------------------------   
##   
## Call:  
## density.default(x = x, bw = "nrd0", kernel = "epanechnikov", na.rm = TRUE)  
##   
## Data: x (92 obs.); Bandwidth 'bw' = 0.8156  
##   
## x y   
## Min. :-2.447 Min. :0.000000   
## 1st Qu.: 2.027 1st Qu.:0.006214   
## Median : 6.500 Median :0.026357   
## Mean : 6.500 Mean :0.055830   
## 3rd Qu.:10.973 3rd Qu.:0.092736   
## Max. :15.447 Max. :0.193579   
##   
## ---------------------------------------------------------------------------------   
## ::: Saque-Pts::1 (KDE)  
## ---------------------------------------------------------------------------------   
##   
## Call:  
## density.default(x = x, bw = "nrd0", kernel = "epanechnikov", na.rm = TRUE)  
##   
## Data: x (93 obs.); Bandwidth 'bw' = 0.8139  
##   
## x y   
## Min. :-2.442 Min. :0.00000   
## 1st Qu.: 2.029 1st Qu.:0.01717   
## Median : 6.500 Median :0.03767   
## Mean : 6.500 Mean :0.05586   
## 3rd Qu.:10.971 3rd Qu.:0.09014   
## Max. :15.442 Max. :0.16595   
##   
## ---------------------------------------------------------------------------------  
##   
## # ... and 11 more tables  
##   
## ---------------------------------------------------------------------------------

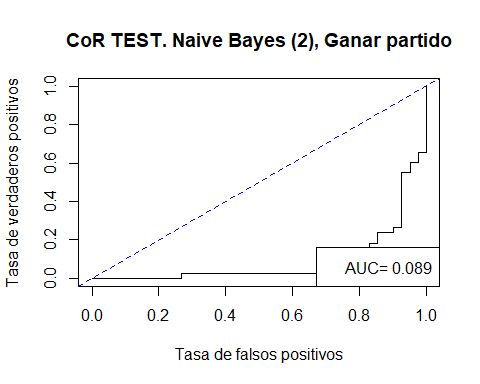
#Evaluar el rendimiento  
preditestNB2<- predict(modeloNB2,dattest[,2:17])  
confutestNB2<-table(dattest$`Ganado/Perdido`,preditestNB2)  
confutestNB2

## preditestNB2  
## 0 1  
## 0 32 9  
## 1 6 32

AciertoNB2=round(100\*mean(dattest$`Ganado/Perdido`==preditestNB2),2)  
SensEspecNB2=round(100\*diag(prop.table(confutestNB2,1)),2)  
c(AciertoNB2, SensEspecNB2)

## 0 1   
## 81.01 78.05 84.21

probabi2<- predict(modeloNB2,dattest[,2:17],  
 type="prob")[,1] #Prob. ganado  
prediobj2<-prediction(probabi2,dattest$`Ganado/Perdido`)  
plot(performance(prediobj2, "tpr","fpr"),  
 main="CoR TEST. Naive Bayes (2), Ganar partido",  
 xlab="Tasa de falsos positivos", ylab="Tasa de verdaderos positivos")  
abline(a=0,b=1,col="blue",lty=2)  
aucNB2<- as.numeric(performance(prediobj2,"auc")@y.values)  
legend("bottomright",legend=paste("AUC=",round(aucNB2,3)))



Resul=rbind(Resul,c(AciertoNB2,aucNB2,SensEspecNB2))  
rownames(Resul)=c("Gauss","Kernel(Poisson)")  
Resul

## Acierto AUC 0 1  
## Gauss 84.81 0.1059050 85.37 84.21  
## Kernel(Poisson) 81.01 0.0885751 78.05 84.21

### Análisis discriminante lineal

library(MASS)

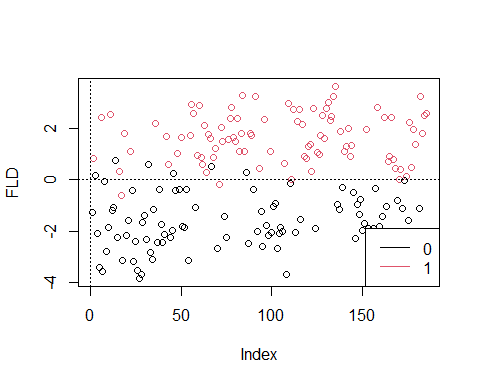
##   
## Attaching package: 'MASS'

## The following object is masked from 'package:dplyr':  
##   
## select

modeloLDA = lda(`Ganado/Perdido` ~. , datent[,2:18])  
modeloLDA

## Call:  
## lda(`Ganado/Perdido` ~ ., data = datent[, 2:18])  
##   
## Prior probabilities of groups:  
## 0 1   
## 0.4972973 0.5027027   
##   
## Group means:  
## `Sets jugados` BP G `Saque-Tot` `Saque-Pts` `Saque-Err`  
## 0 3.782609 19.45652 34.11957 75.55435 3.782609 9.076087  
## 1 3.795699 30.03226 35.98925 88.76344 5.752688 8.752688  
## `Recep-Tot` `Recep-Err` `Recep-Neg` `Recep-Exc` `Ataque-Tot` `Ataque-Err`  
## 0 79.77174 5.619565 23.90217 29.67391 129.4348 12.50000  
## 1 66.79570 3.537634 17.52688 28.51613 127.2581 10.04301  
## `Ataque-Blo` `Ataque-Exc` `Bloqueo-Red` `Bloqueo-Pts`  
## 0 10.217391 41.78261 0.02173913 8.01087  
## 1 7.677419 50.22581 0.02150538 10.05376  
##   
## Coefficients of linear discriminants:  
## LD1  
## `Sets jugados` -0.1624060263  
## BP -0.5705316329  
## G -0.5738163366  
## `Saque-Tot` 0.0509286735  
## `Saque-Pts` 0.5888370016  
## `Saque-Err` -0.0394849312  
## `Recep-Tot` -0.1223139593  
## `Recep-Err` 0.0360822086  
## `Recep-Neg` 0.0137943405  
## `Recep-Exc` 0.0012455588  
## `Ataque-Tot` -0.0008060736  
## `Ataque-Err` 0.0102305788  
## `Ataque-Blo` -0.0352742964  
## `Ataque-Exc` 0.6877558553  
## `Bloqueo-Red` 0.5561707486  
## `Bloqueo-Pts` 0.6223471034

#Coeficientes FLD en cada caso:  
FLD=predict(modeloLDA)$x  
plot(FLD, col = datent[,18]$`Ganado/Perdido`)  
abline(h=0,v=0,lty=3)  
legend("bottomright",col=1:2,lty=1,  
 legend=levels(datent$`Ganado/Perdido`))



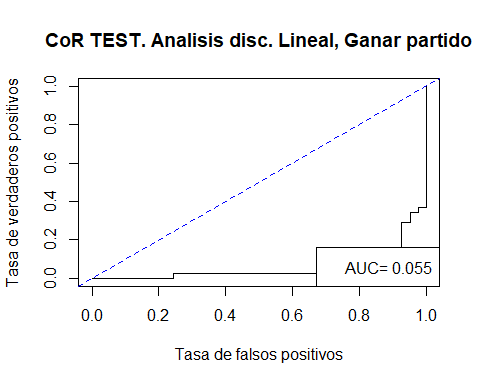
preditestLDA=predict(modeloLDA,newdata=dattest[,2:18])$class  
confutestLDA=table(Real=dat[inditest,18]$`Ganado/Perdido`,Predic=preditestLDA)  
confutestLDA

## Predic  
## Real 0 1  
## 0 36 5  
## 1 4 34

AciertoLDA=round(100\*mean(dattest$`Ganado/Perdido`==preditestLDA),2)  
SensEspecLDA=round(100\*diag(prop.table(confutestLDA,1)),2)  
c(AciertoLDA, SensEspecLDA)

## 0 1   
## 88.61 87.80 89.47

probabiLDA<- predict(modeloLDA,dattest[,2:17],  
 type="prob")$posterior[,1] #Prob. ganado  
prediobjLDA<-prediction(probabiLDA,dattest$`Ganado/Perdido`)  
plot(performance(prediobjLDA, "tpr","fpr"),  
 main="CoR TEST. Analisis disc. Lineal, Ganar partido",  
 xlab="Tasa de falsos positivos", ylab="Tasa de verdaderos positivos")  
abline(a=0,b=1,col="blue",lty=2)  
aucLDA<- as.numeric(performance(prediobjLDA,"auc")@y.values)  
legend("bottomright",legend=paste("AUC=",round(aucLDA,3)))



Resul=rbind(Resul,c(AciertoLDA,aucLDA,SensEspecLDA))  
rownames(Resul)=c("Gauss","Kernel(Poisson)","LDA")  
Resul

## Acierto AUC 0 1  
## Gauss 84.81 0.10590501 85.37 84.21  
## Kernel(Poisson) 81.01 0.08857510 78.05 84.21  
## LDA 88.61 0.05455712 87.80 89.47

### Regresión Logística

modeloRL<- glm(`Ganado/Perdido`~.,family=binomial,data=datent[,2:18])  
summary(modeloRL)

##   
## Call:  
## glm(formula = `Ganado/Perdido` ~ ., family = binomial, data = datent[,   
## 2:18])  
##   
## Deviance Residuals:   
## Min 1Q Median 3Q Max   
## -1.98077 -0.01117 0.00036 0.05498 2.78602   
##   
## Coefficients:  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) -5.123e+00 4.579e+00 -1.119 0.26321   
## `Sets jugados` -6.486e-01 2.230e+00 -0.291 0.77120   
## BP -9.394e+00 2.400e+03 -0.004 0.99688   
## G -9.408e+00 2.400e+03 -0.004 0.99687   
## `Saque-Tot` 3.356e-01 1.608e-01 2.087 0.03686 \*   
## `Saque-Pts` 9.420e+00 2.400e+03 0.004 0.99687   
## `Saque-Err` -9.157e-02 1.518e-01 -0.603 0.54640   
## `Recep-Tot` -5.152e-01 1.988e-01 -2.592 0.00955 \*\*  
## `Recep-Err` -1.064e-01 2.330e-01 -0.457 0.64774   
## `Recep-Neg` 1.037e-01 1.065e-01 0.973 0.33046   
## `Recep-Exc` 1.353e-02 6.774e-02 0.200 0.84164   
## `Ataque-Tot` 4.577e-03 3.706e-02 0.123 0.90171   
## `Ataque-Err` -6.858e-02 1.750e-01 -0.392 0.69521   
## `Ataque-Blo` -3.139e-01 2.175e-01 -1.443 0.14893   
## `Ataque-Exc` 9.769e+00 2.400e+03 0.004 0.99675   
## `Bloqueo-Red` 4.326e+00 2.308e+01 0.187 0.85132   
## `Bloqueo-Pts` 9.541e+00 2.400e+03 0.004 0.99683   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## (Dispersion parameter for binomial family taken to be 1)  
##   
## Null deviance: 256.46 on 184 degrees of freedom  
## Residual deviance: 39.72 on 168 degrees of freedom  
## AIC: 73.72  
##   
## Number of Fisher Scoring iterations: 15

Vemos que todos los coeficientes asociados a las variables (y el termino independiente) no son significativos al 5%, excepto las variables Saque-Tot (0.03686) y Recep-Tot (0.00955)

# Vamos a ver si el modelo nos sirve para ajustar estos datos  
library(generalhoslem)

## Loading required package: reshape

##   
## Attaching package: 'reshape'

## The following objects are masked from 'package:tidyr':  
##   
## expand, smiths

## The following object is masked from 'package:dplyr':  
##   
## rename

prob=fitted(modeloRL) #probabilidades estimadas por el modelo  
HS=logitgof(datent$`Ganado/Perdido`, prob,g=10)

## Warning in logitgof(datent$`Ganado/Perdido`, prob, g = 10): At least one cell  
## in the expected frequencies table is < 1. Chi-square approximation may be  
## incorrect.

#Nos queda un p-valor de 0.5358, luego podemos concluir que el modelo proporciona un buen ajuste.

Modelo con las variables Saque-Tot y Recep-Tot

modeloRL1<- glm(`Ganado/Perdido`~.,family=binomial,data=datent[c("Saque-Tot","Recep-Tot","Ganado/Perdido")])  
summary(modeloRL1)

##   
## Call:  
## glm(formula = `Ganado/Perdido` ~ ., family = binomial, data = datent[c("Saque-Tot",   
## "Recep-Tot", "Ganado/Perdido")])  
##   
## Deviance Residuals:   
## Min 1Q Median 3Q Max   
## -2.34015 -0.07643 0.00665 0.14805 1.79687   
##   
## Coefficients:  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) -3.54069 2.34929 -1.507 0.132   
## `Saque-Tot` 0.38409 0.07376 5.207 1.91e-07 \*\*\*  
## `Recep-Tot` -0.38966 0.07092 -5.494 3.92e-08 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## (Dispersion parameter for binomial family taken to be 1)  
##   
## Null deviance: 256.459 on 184 degrees of freedom  
## Residual deviance: 60.297 on 182 degrees of freedom  
## AIC: 66.297  
##   
## Number of Fisher Scoring iterations: 8

modeloRL1

##   
## Call: glm(formula = `Ganado/Perdido` ~ ., family = binomial, data = datent[c("Saque-Tot",   
## "Recep-Tot", "Ganado/Perdido")])  
##   
## Coefficients:  
## (Intercept) `Saque-Tot` `Recep-Tot`   
## -3.5407 0.3841 -0.3897   
##   
## Degrees of Freedom: 184 Total (i.e. Null); 182 Residual  
## Null Deviance: 256.5   
## Residual Deviance: 60.3 AIC: 66.3

**Ganado/Perdido = -3.5407 + Saque-Tot \* 0.3841 + Recep-Tot \* -0.3897**

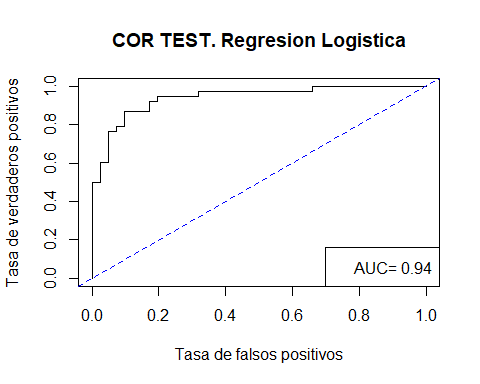
preditestRL=as.numeric(predict(modeloRL1,dat[inditest,], type="response")>0.5)  
confutestRL<-table(Real=dat[inditest,18]$`Ganado/Perdido`,Predic=preditestRL)  
confutestRL

## Predic  
## Real 0 1  
## 0 37 4  
## 1 6 32

AciertoRL=round(100\*mean(as.numeric(dattest$`Ganado/Perdido`)==(preditestRL+1)),2)  
SensEspecRL=round(100\*diag(prop.table(confutestRL,1)),2)  
c(AciertoRL, SensEspecRL)

## 0 1   
## 87.34 90.24 84.21

probabiRL<- predict(modeloRL1,dat[inditest,],type="response") #Prob. 1  
prediobjRL<-prediction(probabiRL,dat[inditest,18])  
plot(performance(prediobjRL, "tpr","fpr"),  
 main="COR TEST. Regresion Logistica",  
 xlab="Tasa de falsos positivos",   
 ylab="Tasa de verdaderos positivos")  
abline(a=0,b=1,col="blue",lty=2)  
aucRL<- as.numeric(performance(prediobjRL,"auc")@y.values)  
legend("bottomright",legend=paste("AUC=",round(aucRL,3)))



Resul=rbind(Resul,c(AciertoRL,aucRL,SensEspecRL))  
rownames(Resul)=c("Gauss","Kernel(Poisson)","LDA","R.Logistica")  
Resul

## Acierto AUC 0 1  
## Gauss 84.81 0.10590501 85.37 84.21  
## Kernel(Poisson) 81.01 0.08857510 78.05 84.21  
## LDA 88.61 0.05455712 87.80 89.47  
## R.Logistica 87.34 0.94030809 90.24 84.21

levels(dat$`Ganado/Perdido`)=c("Perdido","Ganado")  
levels(dattest$`Ganado/Perdido`)=c("Perdido","Ganado")  
levels(datent$`Ganado/Perdido`)=c("Perdido","Ganado")

### Redes Neuronales

library(NeuralNetTools) #para representar graficamente

## Warning: package 'NeuralNetTools' was built under R version 4.1.2

library(caret)

## Loading required package: lattice

##   
## Attaching package: 'caret'

## The following object is masked from 'package:purrr':  
##   
## lift

ctrlRD <- trainControl(method="cv",classProbs = T,  
 summaryFunction = defaultSummary, verboseIter = F)  
  
modeloPM <- train(`Ganado/Perdido`~ ., data = datent[,-1],   
 method = "nnet",   
 trControl = ctrlRD,  
 preProcess =c("center","scale"),  
 tuneGrid=expand.grid(size=1:20,decay=c(0,0.05,0.1)))

## # weights: 19  
## initial value 123.267315   
## iter 10 value 24.195708  
## iter 20 value 11.097200  
## iter 30 value 5.613351  
## iter 40 value 0.388328  
## iter 50 value 0.006355  
## iter 60 value 0.000882  
## iter 70 value 0.000160  
## iter 80 value 0.000127  
## final value 0.000088   
## converged  
## # weights: 37  
## initial value 128.574792   
## iter 10 value 54.455970  
## iter 20 value 12.830178  
## iter 30 value 8.844951  
## iter 40 value 4.607002  
## iter 50 value 3.901707  
## iter 60 value 3.452933  
## iter 70 value 3.411516  
## iter 80 value 3.387825  
## iter 90 value 3.381380  
## iter 100 value 3.271249  
## final value 3.271249   
## stopped after 100 iterations  
## # weights: 55  
## initial value 115.735813   
## iter 10 value 16.366816  
## iter 20 value 8.467460  
## iter 30 value 5.255688  
## iter 40 value 4.888067  
## iter 50 value 2.507102  
## iter 60 value 2.502382  
## iter 70 value 2.502069  
## iter 80 value 2.501915  
## iter 90 value 2.501271  
## iter 100 value 0.005008  
## final value 0.005008   
## stopped after 100 iterations  
## # weights: 73  
## initial value 122.048510   
## iter 10 value 13.051292  
## iter 20 value 1.821926  
## iter 30 value 0.048078  
## iter 40 value 0.000466  
## final value 0.000093   
## converged  
## # weights: 91  
## initial value 120.007822   
## iter 10 value 15.928554  
## iter 20 value 4.562238  
## iter 30 value 0.788114  
## iter 40 value 0.064473  
## iter 50 value 0.006728  
## iter 60 value 0.000283  
## final value 0.000075   
## converged  
## # weights: 109  
## initial value 132.936307   
## iter 10 value 12.505272  
## iter 20 value 0.128724  
## iter 30 value 0.000816  
## final value 0.000041   
## converged  
## # weights: 127  
## initial value 116.813346   
## iter 10 value 10.037275  
## iter 20 value 0.229868  
## iter 30 value 0.013520  
## final value 0.000072   
## converged  
## # weights: 145  
## initial value 121.007658   
## iter 10 value 14.028432  
## iter 20 value 1.272452  
## iter 30 value 0.047477  
## iter 40 value 0.010098  
## iter 50 value 0.002280  
## iter 60 value 0.000325  
## final value 0.000088   
## converged  
## # weights: 163  
## initial value 119.398904   
## iter 10 value 8.219062  
## iter 20 value 0.196584  
## iter 30 value 0.006912  
## iter 40 value 0.000941  
## final value 0.000091   
## converged  
## # weights: 181  
## initial value 129.101267   
## iter 10 value 6.293438  
## iter 20 value 0.066110  
## iter 30 value 0.002040  
## iter 40 value 0.000149  
## final value 0.000068   
## converged  
## # weights: 199  
## initial value 121.807695   
## iter 10 value 9.201500  
## iter 20 value 0.091310  
## iter 30 value 0.006442  
## iter 40 value 0.000430  
## iter 50 value 0.000129  
## iter 50 value 0.000073  
## iter 50 value 0.000073  
## final value 0.000073   
## converged  
## # weights: 217  
## initial value 168.731792   
## iter 10 value 11.231110  
## iter 20 value 0.400935  
## iter 30 value 0.004359  
## iter 40 value 0.000897  
## iter 50 value 0.000113  
## iter 50 value 0.000093  
## iter 50 value 0.000092  
## final value 0.000092   
## converged  
## # weights: 235  
## initial value 111.402369   
## iter 10 value 5.782387  
## iter 20 value 0.079025  
## iter 30 value 0.001296  
## iter 40 value 0.000152  
## iter 40 value 0.000080  
## iter 40 value 0.000077  
## final value 0.000077   
## converged  
## # weights: 253  
## initial value 127.844306   
## iter 10 value 14.425546  
## iter 20 value 0.171158  
## iter 30 value 0.008940  
## iter 40 value 0.001117  
## iter 50 value 0.000453  
## iter 60 value 0.000153  
## final value 0.000065   
## converged  
## # weights: 271  
## initial value 119.772382   
## iter 10 value 11.316267  
## iter 20 value 0.118473  
## iter 30 value 0.005297  
## iter 40 value 0.000176  
## final value 0.000088   
## converged  
## # weights: 289  
## initial value 115.304521   
## iter 10 value 12.022854  
## iter 20 value 0.195029  
## iter 30 value 0.002590  
## final value 0.000089   
## converged  
## # weights: 307  
## initial value 167.558437   
## iter 10 value 9.684924  
## iter 20 value 0.151138  
## iter 30 value 0.003539  
## iter 40 value 0.000180  
## final value 0.000074   
## converged  
## # weights: 325  
## initial value 135.615549   
## iter 10 value 10.168332  
## iter 20 value 0.046989  
## iter 30 value 0.002161  
## iter 40 value 0.000209  
## final value 0.000063   
## converged  
## # weights: 343  
## initial value 117.391909   
## iter 10 value 4.451706  
## iter 20 value 0.044125  
## iter 30 value 0.002010  
## final value 0.000091   
## converged  
## # weights: 361  
## initial value 164.686157   
## iter 10 value 6.436052  
## iter 20 value 0.045426  
## iter 30 value 0.002622  
## iter 40 value 0.000354  
## final value 0.000099   
## converged  
## # weights: 19  
## initial value 123.557232   
## iter 10 value 33.768307  
## iter 20 value 20.500858  
## iter 30 value 19.469667  
## iter 40 value 19.461144  
## iter 50 value 19.461129  
## final value 19.461125   
## converged  
## # weights: 37  
## initial value 120.732298   
## iter 10 value 57.401985  
## iter 20 value 25.699007  
## iter 30 value 17.906924  
## iter 40 value 16.475058  
## iter 50 value 16.452606  
## final value 16.452595   
## converged  
## # weights: 55  
## initial value 126.206538   
## iter 10 value 24.261775  
## iter 20 value 17.570714  
## iter 30 value 14.589378  
## iter 40 value 13.745265  
## iter 50 value 13.506364  
## iter 60 value 13.382646  
## iter 70 value 13.089054  
## iter 80 value 13.085424  
## iter 90 value 13.085310  
## final value 13.085308   
## converged  
## # weights: 73  
## initial value 111.280173   
## iter 10 value 24.123922  
## iter 20 value 16.556156  
## iter 30 value 14.019553  
## iter 40 value 13.251604  
## iter 50 value 12.904722  
## iter 60 value 12.844334  
## iter 70 value 12.834254  
## final value 12.834213   
## converged  
## # weights: 91  
## initial value 117.477182   
## iter 10 value 18.641482  
## iter 20 value 14.263471  
## iter 30 value 13.683133  
## iter 40 value 13.143235  
## iter 50 value 12.806152  
## iter 60 value 12.522556  
## iter 70 value 12.327057  
## iter 80 value 12.305417  
## iter 90 value 12.290101  
## iter 100 value 12.288190  
## final value 12.288190   
## stopped after 100 iterations  
## # weights: 109  
## initial value 125.020178   
## iter 10 value 24.275724  
## iter 20 value 16.809771  
## iter 30 value 13.832986  
## iter 40 value 13.033682  
## iter 50 value 12.690904  
## iter 60 value 12.373693  
## iter 70 value 12.121384  
## iter 80 value 12.064424  
## iter 90 value 12.056404  
## iter 100 value 12.053634  
## final value 12.053634   
## stopped after 100 iterations  
## # weights: 127  
## initial value 130.891501   
## iter 10 value 17.606460  
## iter 20 value 13.102774  
## iter 30 value 12.377816  
## iter 40 value 11.989897  
## iter 50 value 11.876083  
## iter 60 value 11.846201  
## iter 70 value 11.838076  
## iter 80 value 11.837706  
## iter 90 value 11.837678  
## final value 11.837677   
## converged  
## # weights: 145  
## initial value 121.526006   
## iter 10 value 22.882133  
## iter 20 value 14.478586  
## iter 30 value 12.233294  
## iter 40 value 11.624330  
## iter 50 value 11.552046  
## iter 60 value 11.521063  
## iter 70 value 11.516623  
## iter 80 value 11.511995  
## iter 90 value 11.507258  
## iter 100 value 11.465256  
## final value 11.465256   
## stopped after 100 iterations  
## # weights: 163  
## initial value 120.358462   
## iter 10 value 22.322543  
## iter 20 value 15.492187  
## iter 30 value 13.336379  
## iter 40 value 12.003411  
## iter 50 value 11.662690  
## iter 60 value 11.439135  
## iter 70 value 11.378198  
## iter 80 value 11.348700  
## iter 90 value 11.327901  
## iter 100 value 11.324559  
## final value 11.324559   
## stopped after 100 iterations  
## # weights: 181  
## initial value 114.771439   
## iter 10 value 29.812776  
## iter 20 value 13.826666  
## iter 30 value 12.313491  
## iter 40 value 11.727940  
## iter 50 value 11.600392  
## iter 60 value 11.467276  
## iter 70 value 11.364185  
## iter 80 value 11.338343  
## iter 90 value 11.335016  
## iter 100 value 11.333628  
## final value 11.333628   
## stopped after 100 iterations  
## # weights: 199  
## initial value 142.445032   
## iter 10 value 17.737458  
## iter 20 value 12.991425  
## iter 30 value 11.900981  
## iter 40 value 11.500058  
## iter 50 value 11.399956  
## iter 60 value 11.353987  
## iter 70 value 11.343823  
## iter 80 value 11.341268  
## iter 90 value 11.340564  
## iter 100 value 11.335070  
## final value 11.335070   
## stopped after 100 iterations  
## # weights: 217  
## initial value 151.613843   
## iter 10 value 20.254104  
## iter 20 value 13.780756  
## iter 30 value 12.073862  
## iter 40 value 11.580836  
## iter 50 value 11.437284  
## iter 60 value 11.370477  
## iter 70 value 11.311418  
## iter 80 value 11.272325  
## iter 90 value 11.269371  
## iter 100 value 11.268131  
## final value 11.268131   
## stopped after 100 iterations  
## # weights: 235  
## initial value 140.349821   
## iter 10 value 17.584017  
## iter 20 value 12.370750  
## iter 30 value 11.536074  
## iter 40 value 11.215340  
## iter 50 value 11.170802  
## iter 60 value 11.157795  
## iter 70 value 11.148260  
## iter 80 value 11.146272  
## iter 90 value 11.145613  
## iter 100 value 11.145514  
## final value 11.145514   
## stopped after 100 iterations  
## # weights: 253  
## initial value 97.360724   
## iter 10 value 17.084341  
## iter 20 value 12.407945  
## iter 30 value 11.780007  
## iter 40 value 11.594157  
## iter 50 value 11.480150  
## iter 60 value 11.423379  
## iter 70 value 11.390615  
## iter 80 value 11.376238  
## iter 90 value 11.373513  
## iter 100 value 11.372294  
## final value 11.372294   
## stopped after 100 iterations  
## # weights: 271  
## initial value 116.843169   
## iter 10 value 19.014971  
## iter 20 value 12.416594  
## iter 30 value 11.498369  
## iter 40 value 11.241198  
## iter 50 value 11.146502  
## iter 60 value 11.116874  
## iter 70 value 11.103471  
## iter 80 value 11.088619  
## iter 90 value 11.086279  
## iter 100 value 11.084321  
## final value 11.084321   
## stopped after 100 iterations  
## # weights: 289  
## initial value 130.536354   
## iter 10 value 18.576796  
## iter 20 value 12.605062  
## iter 30 value 11.678283  
## iter 40 value 11.366262  
## iter 50 value 11.228526  
## iter 60 value 11.176426  
## iter 70 value 11.131940  
## iter 80 value 11.116535  
## iter 90 value 11.107189  
## iter 100 value 11.086892  
## final value 11.086892   
## stopped after 100 iterations  
## # weights: 307  
## initial value 120.960455   
## iter 10 value 18.408377  
## iter 20 value 12.997239  
## iter 30 value 11.825966  
## iter 40 value 11.530978  
## iter 50 value 11.301587  
## iter 60 value 11.217375  
## iter 70 value 11.196570  
## iter 80 value 11.188378  
## iter 90 value 11.175627  
## iter 100 value 11.170169  
## final value 11.170169   
## stopped after 100 iterations  
## # weights: 325  
## initial value 143.394670   
## iter 10 value 17.558186  
## iter 20 value 12.374611  
## iter 30 value 11.615577  
## iter 40 value 11.272528  
## iter 50 value 11.197633  
## iter 60 value 11.155118  
## iter 70 value 11.149412  
## iter 80 value 11.146511  
## iter 90 value 11.144606  
## iter 100 value 11.143605  
## final value 11.143605   
## stopped after 100 iterations  
## # weights: 343  
## initial value 118.969942   
## iter 10 value 17.334978  
## iter 20 value 12.540380  
## iter 30 value 11.646953  
## iter 40 value 11.357547  
## iter 50 value 11.273844  
## iter 60 value 11.244319  
## iter 70 value 11.222672  
## iter 80 value 11.218697  
## iter 90 value 11.216115  
## iter 100 value 11.215277  
## final value 11.215277   
## stopped after 100 iterations  
## # weights: 361  
## initial value 120.929113   
## iter 10 value 17.031876  
## iter 20 value 11.972215  
## iter 30 value 11.319620  
## iter 40 value 11.200651  
## iter 50 value 11.158298  
## iter 60 value 11.115018  
## iter 70 value 11.091088  
## iter 80 value 11.082203  
## iter 90 value 11.078349  
## iter 100 value 11.073680  
## final value 11.073680   
## stopped after 100 iterations  
## # weights: 19  
## initial value 118.018553   
## iter 10 value 38.744672  
## iter 20 value 27.877065  
## iter 30 value 26.045084  
## iter 40 value 25.852878  
## final value 25.852869   
## converged  
## # weights: 37  
## initial value 116.648624   
## iter 10 value 30.868534  
## iter 20 value 21.215025  
## iter 30 value 20.900824  
## iter 40 value 20.893244  
## final value 20.893237   
## converged  
## # weights: 55  
## initial value 148.386826   
## iter 10 value 40.194687  
## iter 20 value 24.454514  
## iter 30 value 21.836670  
## iter 40 value 20.368975  
## iter 50 value 19.999456  
## iter 60 value 19.986231  
## iter 70 value 19.983718  
## iter 80 value 19.983539  
## iter 90 value 19.982742  
## iter 100 value 19.979936  
## final value 19.979936   
## stopped after 100 iterations  
## # weights: 73  
## initial value 134.244424   
## iter 10 value 26.834683  
## iter 20 value 21.193703  
## iter 30 value 19.835992  
## iter 40 value 19.161150  
## iter 50 value 19.108982  
## iter 60 value 19.098826  
## iter 70 value 19.098143  
## final value 19.098129   
## converged  
## # weights: 91  
## initial value 124.123056   
## iter 10 value 28.606879  
## iter 20 value 20.957442  
## iter 30 value 19.270961  
## iter 40 value 18.507547  
## iter 50 value 18.468435  
## iter 60 value 18.467192  
## iter 70 value 18.467062  
## final value 18.467051   
## converged  
## # weights: 109  
## initial value 114.358820   
## iter 10 value 24.774503  
## iter 20 value 19.467849  
## iter 30 value 18.818069  
## iter 40 value 18.505985  
## iter 50 value 18.438403  
## iter 60 value 18.279230  
## iter 70 value 18.261087  
## iter 80 value 18.258525  
## iter 90 value 18.258484  
## iter 90 value 18.258484  
## iter 90 value 18.258484  
## final value 18.258484   
## converged  
## # weights: 127  
## initial value 117.940193   
## iter 10 value 24.491937  
## iter 20 value 18.833518  
## iter 30 value 18.176468  
## iter 40 value 18.043975  
## iter 50 value 18.029678  
## iter 60 value 18.027697  
## iter 70 value 18.027480  
## final value 18.027472   
## converged  
## # weights: 145  
## initial value 117.611948   
## iter 10 value 22.765806  
## iter 20 value 18.864824  
## iter 30 value 18.226916  
## iter 40 value 17.983134  
## iter 50 value 17.847789  
## iter 60 value 17.836451  
## iter 70 value 17.833272  
## iter 80 value 17.832907  
## iter 90 value 17.832785  
## iter 100 value 17.830207  
## final value 17.830207   
## stopped after 100 iterations  
## # weights: 163  
## initial value 117.386446   
## iter 10 value 23.327577  
## iter 20 value 19.333375  
## iter 30 value 18.275732  
## iter 40 value 18.099247  
## iter 50 value 18.020171  
## iter 60 value 17.953774  
## iter 70 value 17.919454  
## iter 80 value 17.906685  
## iter 90 value 17.896464  
## iter 100 value 17.893793  
## final value 17.893793   
## stopped after 100 iterations  
## # weights: 181  
## initial value 109.207859   
## iter 10 value 33.126932  
## iter 20 value 19.882998  
## iter 30 value 18.886058  
## iter 40 value 18.262128  
## iter 50 value 18.120988  
## iter 60 value 17.906852  
## iter 70 value 17.739434  
## iter 80 value 17.723845  
## iter 90 value 17.709947  
## iter 100 value 17.701516  
## final value 17.701516   
## stopped after 100 iterations  
## # weights: 199  
## initial value 140.704898   
## iter 10 value 24.673880  
## iter 20 value 19.473424  
## iter 30 value 18.466717  
## iter 40 value 17.936758  
## iter 50 value 17.872602  
## iter 60 value 17.860819  
## iter 70 value 17.852489  
## iter 80 value 17.813507  
## iter 90 value 17.789467  
## iter 100 value 17.787863  
## final value 17.787863   
## stopped after 100 iterations  
## # weights: 217  
## initial value 130.141806   
## iter 10 value 22.739112  
## iter 20 value 18.372001  
## iter 30 value 17.826565  
## iter 40 value 17.668038  
## iter 50 value 17.629446  
## iter 60 value 17.608395  
## iter 70 value 17.596522  
## iter 80 value 17.593441  
## iter 90 value 17.591777  
## iter 100 value 17.591462  
## final value 17.591462   
## stopped after 100 iterations  
## # weights: 235  
## initial value 180.243982   
## iter 10 value 26.222121  
## iter 20 value 19.861774  
## iter 30 value 18.267911  
## iter 40 value 18.020537  
## iter 50 value 17.824025  
## iter 60 value 17.788221  
## iter 70 value 17.762902  
## iter 80 value 17.757481  
## iter 90 value 17.742926  
## iter 100 value 17.738541  
## final value 17.738541   
## stopped after 100 iterations  
## # weights: 253  
## initial value 119.465582   
## iter 10 value 39.491176  
## iter 20 value 18.864895  
## iter 30 value 18.037767  
## iter 40 value 17.731334  
## iter 50 value 17.658724  
## iter 60 value 17.636546  
## iter 70 value 17.634475  
## iter 80 value 17.634178  
## iter 90 value 17.633936  
## iter 100 value 17.633896  
## final value 17.633896   
## stopped after 100 iterations  
## # weights: 271  
## initial value 137.350356   
## iter 10 value 24.907604  
## iter 20 value 19.176602  
## iter 30 value 18.356609  
## iter 40 value 18.024837  
## iter 50 value 17.910002  
## iter 60 value 17.867499  
## iter 70 value 17.845817  
## iter 80 value 17.839761  
## iter 90 value 17.838943  
## iter 100 value 17.838571  
## final value 17.838571   
## stopped after 100 iterations  
## # weights: 289  
## initial value 155.662352   
## iter 10 value 23.256684  
## iter 20 value 18.125141  
## iter 30 value 17.841689  
## iter 40 value 17.698630  
## iter 50 value 17.551363  
## iter 60 value 17.524150  
## iter 70 value 17.494052  
## iter 80 value 17.490525  
## iter 90 value 17.490092  
## iter 100 value 17.489990  
## final value 17.489990   
## stopped after 100 iterations  
## # weights: 307  
## initial value 128.694259   
## iter 10 value 23.887516  
## iter 20 value 18.603225  
## iter 30 value 18.082200  
## iter 40 value 17.938208  
## iter 50 value 17.891167  
## iter 60 value 17.850565  
## iter 70 value 17.734852  
## iter 80 value 17.614137  
## iter 90 value 17.531428  
## iter 100 value 17.517784  
## final value 17.517784   
## stopped after 100 iterations  
## # weights: 325  
## initial value 141.581450   
## iter 10 value 25.366471  
## iter 20 value 18.696299  
## iter 30 value 18.051532  
## iter 40 value 17.849551  
## iter 50 value 17.729497  
## iter 60 value 17.628329  
## iter 70 value 17.494083  
## iter 80 value 17.473120  
## iter 90 value 17.462277  
## iter 100 value 17.457806  
## final value 17.457806   
## stopped after 100 iterations  
## # weights: 343  
## initial value 156.515321   
## iter 10 value 22.175792  
## iter 20 value 18.467969  
## iter 30 value 17.945386  
## iter 40 value 17.740519  
## iter 50 value 17.640266  
## iter 60 value 17.619995  
## iter 70 value 17.531234  
## iter 80 value 17.453171  
## iter 90 value 17.449781  
## iter 100 value 17.448948  
## final value 17.448948   
## stopped after 100 iterations  
## # weights: 361  
## initial value 128.779031   
## iter 10 value 48.757209  
## iter 20 value 21.383145  
## iter 30 value 18.581378  
## iter 40 value 17.903083  
## iter 50 value 17.657448  
## iter 60 value 17.561364  
## iter 70 value 17.500691  
## iter 80 value 17.462382  
## iter 90 value 17.453589  
## iter 100 value 17.447312  
## final value 17.447312   
## stopped after 100 iterations  
## # weights: 19  
## initial value 114.307956   
## iter 10 value 21.783014  
## iter 20 value 13.584530  
## iter 30 value 12.820615  
## iter 40 value 9.915254  
## iter 50 value 9.636856  
## iter 60 value 9.597130  
## iter 70 value 9.569735  
## iter 80 value 9.547880  
## iter 90 value 9.544142  
## iter 100 value 9.540448  
## final value 9.540448   
## stopped after 100 iterations  
## # weights: 37  
## initial value 135.606639   
## iter 10 value 27.773358  
## iter 20 value 13.221951  
## iter 30 value 7.892142  
## iter 40 value 5.421245  
## iter 50 value 4.816798  
## iter 60 value 4.780784  
## iter 70 value 4.769631  
## iter 80 value 4.767485  
## iter 90 value 4.767456  
## final value 4.767448   
## converged  
## # weights: 55  
## initial value 115.348400   
## iter 10 value 20.774290  
## iter 20 value 6.038170  
## iter 30 value 4.197300  
## iter 40 value 4.183319  
## iter 50 value 4.103457  
## iter 60 value 3.760627  
## iter 70 value 3.375012  
## iter 80 value 3.366442  
## iter 90 value 3.366215  
## iter 100 value 3.366104  
## final value 3.366104   
## stopped after 100 iterations  
## # weights: 73  
## initial value 122.858237   
## iter 10 value 20.670113  
## iter 20 value 7.303674  
## iter 30 value 6.006585  
## iter 40 value 5.808271  
## iter 50 value 5.626003  
## iter 60 value 5.575060  
## iter 70 value 5.495856  
## iter 80 value 5.297085  
## iter 90 value 5.279735  
## iter 100 value 5.042771  
## final value 5.042771   
## stopped after 100 iterations  
## # weights: 91  
## initial value 118.788293   
## iter 10 value 24.505566  
## iter 20 value 4.936779  
## iter 30 value 0.189684  
## iter 40 value 0.015836  
## iter 50 value 0.001607  
## final value 0.000057   
## converged  
## # weights: 109  
## initial value 109.152180   
## iter 10 value 11.430733  
## iter 20 value 0.657161  
## iter 30 value 0.009245  
## final value 0.000084   
## converged  
## # weights: 127  
## initial value 139.613082   
## iter 10 value 15.283721  
## iter 20 value 1.041811  
## iter 30 value 0.007542  
## iter 40 value 0.000288  
## final value 0.000094   
## converged  
## # weights: 145  
## initial value 127.313857   
## iter 10 value 12.302317  
## iter 20 value 0.448648  
## iter 30 value 0.002968  
## iter 40 value 0.000136  
## iter 40 value 0.000075  
## iter 40 value 0.000075  
## final value 0.000075   
## converged  
## # weights: 163  
## initial value 111.566368   
## iter 10 value 11.161615  
## iter 20 value 0.417655  
## iter 30 value 0.005807  
## final value 0.000084   
## converged  
## # weights: 181  
## initial value 120.781989   
## iter 10 value 12.895915  
## iter 20 value 3.028481  
## iter 30 value 1.415895  
## iter 40 value 0.536892  
## iter 50 value 0.030207  
## iter 60 value 0.009987  
## iter 70 value 0.002789  
## iter 80 value 0.002513  
## iter 90 value 0.000863  
## iter 100 value 0.000402  
## final value 0.000402   
## stopped after 100 iterations  
## # weights: 199  
## initial value 143.658598   
## iter 10 value 12.268052  
## iter 20 value 1.708183  
## iter 30 value 0.124713  
## iter 40 value 0.008152  
## iter 50 value 0.000577  
## final value 0.000090   
## converged  
## # weights: 217  
## initial value 123.229061   
## iter 10 value 10.080008  
## iter 20 value 0.324494  
## iter 30 value 0.012151  
## iter 40 value 0.000555  
## final value 0.000084   
## converged  
## # weights: 235  
## initial value 125.765687   
## iter 10 value 14.440913  
## iter 20 value 3.290173  
## iter 30 value 0.097226  
## iter 40 value 0.004791  
## iter 50 value 0.001115  
## iter 60 value 0.000155  
## iter 60 value 0.000094  
## iter 60 value 0.000094  
## final value 0.000094   
## converged  
## # weights: 253  
## initial value 117.547649   
## iter 10 value 11.330701  
## iter 20 value 0.833487  
## iter 30 value 0.008034  
## iter 40 value 0.000969  
## iter 50 value 0.000195  
## iter 60 value 0.000122  
## final value 0.000098   
## converged  
## # weights: 271  
## initial value 144.010821   
## iter 10 value 10.602047  
## iter 20 value 0.152758  
## iter 30 value 0.005005  
## iter 40 value 0.000151  
## final value 0.000079   
## converged  
## # weights: 289  
## initial value 129.587200   
## iter 10 value 9.122881  
## iter 20 value 0.157989  
## iter 30 value 0.005754  
## iter 40 value 0.000684  
## iter 50 value 0.000248  
## iter 60 value 0.000114  
## iter 60 value 0.000074  
## iter 60 value 0.000074  
## final value 0.000074   
## converged  
## # weights: 307  
## initial value 196.663145   
## iter 10 value 12.423223  
## iter 20 value 0.112875  
## iter 30 value 0.002027  
## final value 0.000092   
## converged  
## # weights: 325  
## initial value 117.111768   
## iter 10 value 12.335836  
## iter 20 value 0.212061  
## iter 30 value 0.002224  
## final value 0.000094   
## converged  
## # weights: 343  
## initial value 149.016110   
## iter 10 value 12.293947  
## iter 20 value 0.233929  
## iter 30 value 0.002857  
## iter 40 value 0.000304  
## iter 50 value 0.000100  
## iter 50 value 0.000080  
## iter 50 value 0.000079  
## final value 0.000079   
## converged  
## # weights: 361  
## initial value 136.518802   
## iter 10 value 12.551083  
## iter 20 value 0.420237  
## iter 30 value 0.009947  
## iter 40 value 0.001590  
## iter 50 value 0.000246  
## final value 0.000100   
## converged  
## # weights: 19  
## initial value 115.553614   
## iter 10 value 43.348252  
## iter 20 value 26.458326  
## iter 30 value 23.239708  
## iter 40 value 23.231805  
## iter 40 value 23.231805  
## final value 23.231805   
## converged  
## # weights: 37  
## initial value 118.646877   
## iter 10 value 33.758835  
## iter 20 value 18.311108  
## iter 30 value 17.181259  
## iter 40 value 16.856418  
## iter 50 value 16.546184  
## iter 60 value 16.463088  
## iter 70 value 16.462741  
## iter 70 value 16.462741  
## iter 70 value 16.462741  
## final value 16.462741   
## converged  
## # weights: 55  
## initial value 153.806762   
## iter 10 value 26.689947  
## iter 20 value 17.924903  
## iter 30 value 15.656079  
## iter 40 value 15.297448  
## iter 50 value 14.764183  
## iter 60 value 14.573282  
## iter 70 value 14.513373  
## iter 80 value 14.512316  
## iter 90 value 14.512310  
## iter 90 value 14.512309  
## iter 90 value 14.512309  
## final value 14.512309   
## converged  
## # weights: 73  
## initial value 151.158454   
## iter 10 value 27.163076  
## iter 20 value 16.670173  
## iter 30 value 14.602538  
## iter 40 value 14.083810  
## iter 50 value 13.956577  
## iter 60 value 13.951168  
## iter 70 value 13.950410  
## iter 80 value 13.950284  
## final value 13.950280   
## converged  
## # weights: 91  
## initial value 117.640919   
## iter 10 value 22.234387  
## iter 20 value 17.414965  
## iter 30 value 14.637461  
## iter 40 value 13.937706  
## iter 50 value 13.791866  
## iter 60 value 13.638911  
## iter 70 value 13.499206  
## iter 80 value 13.330663  
## iter 90 value 13.256412  
## iter 100 value 13.252970  
## final value 13.252970   
## stopped after 100 iterations  
## # weights: 109  
## initial value 121.362170   
## iter 10 value 21.873542  
## iter 20 value 15.617699  
## iter 30 value 14.084906  
## iter 40 value 13.390871  
## iter 50 value 13.301491  
## iter 60 value 13.238672  
## iter 70 value 13.187306  
## iter 80 value 13.056229  
## iter 90 value 13.027166  
## iter 100 value 12.901957  
## final value 12.901957   
## stopped after 100 iterations  
## # weights: 127  
## initial value 119.833695   
## iter 10 value 25.719706  
## iter 20 value 18.098562  
## iter 30 value 15.219083  
## iter 40 value 14.472910  
## iter 50 value 14.197800  
## iter 60 value 13.830544  
## iter 70 value 13.484411  
## iter 80 value 13.331764  
## iter 90 value 13.320380  
## iter 100 value 13.285731  
## final value 13.285731   
## stopped after 100 iterations  
## # weights: 145  
## initial value 134.082684   
## iter 10 value 20.823267  
## iter 20 value 14.471242  
## iter 30 value 13.152641  
## iter 40 value 12.828265  
## iter 50 value 12.768393  
## iter 60 value 12.763143  
## iter 70 value 12.762348  
## iter 80 value 12.761700  
## iter 90 value 12.752248  
## iter 100 value 12.735142  
## final value 12.735142   
## stopped after 100 iterations  
## # weights: 163  
## initial value 110.895376   
## iter 10 value 22.039981  
## iter 20 value 14.593597  
## iter 30 value 13.133385  
## iter 40 value 12.823605  
## iter 50 value 12.749614  
## iter 60 value 12.681780  
## iter 70 value 12.644249  
## iter 80 value 12.641204  
## iter 90 value 12.640150  
## iter 100 value 12.639777  
## final value 12.639777   
## stopped after 100 iterations  
## # weights: 181  
## initial value 126.379786   
## iter 10 value 30.711016  
## iter 20 value 17.281883  
## iter 30 value 14.375464  
## iter 40 value 13.100148  
## iter 50 value 12.798985  
## iter 60 value 12.624722  
## iter 70 value 12.585049  
## iter 80 value 12.577761  
## iter 90 value 12.576075  
## iter 100 value 12.574990  
## final value 12.574990   
## stopped after 100 iterations  
## # weights: 199  
## initial value 136.920381   
## iter 10 value 22.576542  
## iter 20 value 15.281403  
## iter 30 value 13.447299  
## iter 40 value 12.874422  
## iter 50 value 12.666934  
## iter 60 value 12.572379  
## iter 70 value 12.546981  
## iter 80 value 12.531788  
## iter 90 value 12.527546  
## iter 100 value 12.525200  
## final value 12.525200   
## stopped after 100 iterations  
## # weights: 217  
## initial value 118.873549   
## iter 10 value 21.267647  
## iter 20 value 14.220062  
## iter 30 value 13.076626  
## iter 40 value 12.768089  
## iter 50 value 12.616431  
## iter 60 value 12.593053  
## iter 70 value 12.588656  
## iter 80 value 12.579228  
## iter 90 value 12.576378  
## iter 100 value 12.575962  
## final value 12.575962   
## stopped after 100 iterations  
## # weights: 235  
## initial value 167.140454   
## iter 10 value 19.003040  
## iter 20 value 14.030584  
## iter 30 value 12.873349  
## iter 40 value 12.597185  
## iter 50 value 12.533018  
## iter 60 value 12.517938  
## iter 70 value 12.513708  
## iter 80 value 12.512225  
## iter 90 value 12.511397  
## iter 100 value 12.511271  
## final value 12.511271   
## stopped after 100 iterations  
## # weights: 253  
## initial value 141.777262   
## iter 10 value 26.692664  
## iter 20 value 15.385281  
## iter 30 value 13.304350  
## iter 40 value 12.837181  
## iter 50 value 12.620213  
## iter 60 value 12.537543  
## iter 70 value 12.514024  
## iter 80 value 12.492874  
## iter 90 value 12.489449  
## iter 100 value 12.485735  
## final value 12.485735   
## stopped after 100 iterations  
## # weights: 271  
## initial value 126.257764   
## iter 10 value 20.018998  
## iter 20 value 14.065335  
## iter 30 value 12.902100  
## iter 40 value 12.582055  
## iter 50 value 12.522259  
## iter 60 value 12.514396  
## iter 70 value 12.508096  
## iter 80 value 12.494068  
## iter 90 value 12.482921  
## iter 100 value 12.478855  
## final value 12.478855   
## stopped after 100 iterations  
## # weights: 289  
## initial value 127.372184   
## iter 10 value 20.607255  
## iter 20 value 14.831377  
## iter 30 value 13.143497  
## iter 40 value 12.713289  
## iter 50 value 12.582592  
## iter 60 value 12.544992  
## iter 70 value 12.534077  
## iter 80 value 12.528351  
## iter 90 value 12.518600  
## iter 100 value 12.513608  
## final value 12.513608   
## stopped after 100 iterations  
## # weights: 307  
## initial value 120.053838   
## iter 10 value 24.019587  
## iter 20 value 14.921083  
## iter 30 value 12.910377  
## iter 40 value 12.653260  
## iter 50 value 12.541840  
## iter 60 value 12.504721  
## iter 70 value 12.490135  
## iter 80 value 12.479489  
## iter 90 value 12.460434  
## iter 100 value 12.453400  
## final value 12.453400   
## stopped after 100 iterations  
## # weights: 325  
## initial value 104.714333   
## iter 10 value 19.837898  
## iter 20 value 13.921495  
## iter 30 value 12.838224  
## iter 40 value 12.559828  
## iter 50 value 12.482418  
## iter 60 value 12.471693  
## iter 70 value 12.468814  
## iter 80 value 12.468113  
## iter 90 value 12.467884  
## iter 100 value 12.467746  
## final value 12.467746   
## stopped after 100 iterations  
## # weights: 343  
## initial value 120.639422   
## iter 10 value 24.493969  
## iter 20 value 14.280457  
## iter 30 value 12.962770  
## iter 40 value 12.747048  
## iter 50 value 12.602392  
## iter 60 value 12.568076  
## iter 70 value 12.533353  
## iter 80 value 12.470354  
## iter 90 value 12.455072  
## iter 100 value 12.451478  
## final value 12.451478   
## stopped after 100 iterations  
## # weights: 361  
## initial value 113.333816   
## iter 10 value 19.549557  
## iter 20 value 13.654439  
## iter 30 value 12.804512  
## iter 40 value 12.562101  
## iter 50 value 12.508136  
## iter 60 value 12.497571  
## iter 70 value 12.492850  
## iter 80 value 12.490428  
## iter 90 value 12.488638  
## iter 100 value 12.487685  
## final value 12.487685   
## stopped after 100 iterations  
## # weights: 19  
## initial value 114.701461   
## iter 10 value 35.645733  
## iter 20 value 28.482656  
## iter 30 value 27.819828  
## final value 27.819827   
## converged  
## # weights: 37  
## initial value 112.567798   
## iter 10 value 37.762450  
## iter 20 value 25.881995  
## iter 30 value 22.860474  
## iter 40 value 22.494965  
## iter 50 value 22.490953  
## final value 22.490944   
## converged  
## # weights: 55  
## initial value 110.158822   
## iter 10 value 39.993312  
## iter 20 value 22.776548  
## iter 30 value 21.011547  
## iter 40 value 20.770072  
## iter 50 value 20.765923  
## final value 20.765895   
## converged  
## # weights: 73  
## initial value 106.126136   
## iter 10 value 27.076555  
## iter 20 value 21.313633  
## iter 30 value 20.505432  
## iter 40 value 20.331997  
## iter 50 value 20.309380  
## iter 60 value 20.300775  
## iter 70 value 20.298237  
## final value 20.298003   
## converged  
## # weights: 91  
## initial value 123.185609   
## iter 10 value 31.013196  
## iter 20 value 22.202471  
## iter 30 value 20.922332  
## iter 40 value 20.231813  
## iter 50 value 20.075012  
## iter 60 value 20.012179  
## iter 70 value 20.001676  
## iter 80 value 20.000866  
## final value 20.000863   
## converged  
## # weights: 109  
## initial value 114.861338   
## iter 10 value 24.410186  
## iter 20 value 21.032625  
## iter 30 value 20.214600  
## iter 40 value 19.942319  
## iter 50 value 19.883342  
## iter 60 value 19.826826  
## iter 70 value 19.757873  
## iter 80 value 19.750770  
## iter 90 value 19.750569  
## final value 19.750565   
## converged  
## # weights: 127  
## initial value 123.794712   
## iter 10 value 30.104280  
## iter 20 value 22.419252  
## iter 30 value 20.678656  
## iter 40 value 20.217619  
## iter 50 value 19.911062  
## iter 60 value 19.615097  
## iter 70 value 19.575228  
## iter 80 value 19.566557  
## iter 90 value 19.538501  
## iter 100 value 19.536128  
## final value 19.536128   
## stopped after 100 iterations  
## # weights: 145  
## initial value 136.128398   
## iter 10 value 43.777328  
## iter 20 value 21.998478  
## iter 30 value 20.253791  
## iter 40 value 19.718063  
## iter 50 value 19.477603  
## iter 60 value 19.429571  
## iter 70 value 19.394577  
## iter 80 value 19.332873  
## iter 90 value 19.324608  
## iter 100 value 19.324362  
## final value 19.324362   
## stopped after 100 iterations  
## # weights: 163  
## initial value 121.377078   
## iter 10 value 29.567668  
## iter 20 value 20.828421  
## iter 30 value 19.772307  
## iter 40 value 19.587166  
## iter 50 value 19.495810  
## iter 60 value 19.471661  
## iter 70 value 19.467721  
## iter 80 value 19.466951  
## iter 90 value 19.466329  
## iter 100 value 19.466274  
## final value 19.466274   
## stopped after 100 iterations  
## # weights: 181  
## initial value 115.760019   
## iter 10 value 26.037646  
## iter 20 value 20.492208  
## iter 30 value 19.659196  
## iter 40 value 19.501271  
## iter 50 value 19.408289  
## iter 60 value 19.366006  
## iter 70 value 19.357809  
## iter 80 value 19.350358  
## iter 90 value 19.345089  
## iter 100 value 19.344057  
## final value 19.344057   
## stopped after 100 iterations  
## # weights: 199  
## initial value 141.643636   
## iter 10 value 31.294238  
## iter 20 value 21.080380  
## iter 30 value 19.857097  
## iter 40 value 19.590844  
## iter 50 value 19.557088  
## iter 60 value 19.551116  
## iter 70 value 19.548502  
## iter 80 value 19.548214  
## iter 90 value 19.548100  
## iter 100 value 19.548084  
## final value 19.548084   
## stopped after 100 iterations  
## # weights: 217  
## initial value 123.394616   
## iter 10 value 24.785316  
## iter 20 value 20.087390  
## iter 30 value 19.544537  
## iter 40 value 19.349212  
## iter 50 value 19.228569  
## iter 60 value 19.197791  
## iter 70 value 19.186735  
## iter 80 value 19.159393  
## iter 90 value 19.156401  
## iter 100 value 19.155775  
## final value 19.155775   
## stopped after 100 iterations  
## # weights: 235  
## initial value 149.587606   
## iter 10 value 26.067687  
## iter 20 value 20.447015  
## iter 30 value 19.660772  
## iter 40 value 19.484606  
## iter 50 value 19.424153  
## iter 60 value 19.321753  
## iter 70 value 19.293203  
## iter 80 value 19.257209  
## iter 90 value 19.164654  
## iter 100 value 19.140422  
## final value 19.140422   
## stopped after 100 iterations  
## # weights: 253  
## initial value 120.761870   
## iter 10 value 29.325013  
## iter 20 value 20.102531  
## iter 30 value 19.443213  
## iter 40 value 19.262829  
## iter 50 value 19.156660  
## iter 60 value 19.128311  
## iter 70 value 19.121689  
## iter 80 value 19.120934  
## iter 90 value 19.120779  
## iter 100 value 19.120731  
## final value 19.120731   
## stopped after 100 iterations  
## # weights: 271  
## initial value 129.884378   
## iter 10 value 29.964784  
## iter 20 value 20.114955  
## iter 30 value 19.342410  
## iter 40 value 19.147942  
## iter 50 value 19.120638  
## iter 60 value 19.113537  
## iter 70 value 19.111010  
## iter 80 value 19.109156  
## iter 90 value 19.108986  
## iter 100 value 19.108924  
## final value 19.108924   
## stopped after 100 iterations  
## # weights: 289  
## initial value 93.245883   
## iter 10 value 33.503613  
## iter 20 value 20.922989  
## iter 30 value 19.524406  
## iter 40 value 19.319513  
## iter 50 value 19.258141  
## iter 60 value 19.239474  
## iter 70 value 19.232035  
## iter 80 value 19.230809  
## iter 90 value 19.230385  
## iter 100 value 19.230285  
## final value 19.230285   
## stopped after 100 iterations  
## # weights: 307  
## initial value 100.088320   
## iter 10 value 26.411883  
## iter 20 value 20.735558  
## iter 30 value 19.652533  
## iter 40 value 19.398106  
## iter 50 value 19.306920  
## iter 60 value 19.151724  
## iter 70 value 19.111526  
## iter 80 value 19.101787  
## iter 90 value 19.094415  
## iter 100 value 19.090392  
## final value 19.090392   
## stopped after 100 iterations  
## # weights: 325  
## initial value 109.422027   
## iter 10 value 25.152988  
## iter 20 value 20.403173  
## iter 30 value 19.538622  
## iter 40 value 19.317742  
## iter 50 value 19.211302  
## iter 60 value 19.113359  
## iter 70 value 19.095324  
## iter 80 value 19.091334  
## iter 90 value 19.090999  
## iter 100 value 19.090953  
## final value 19.090953   
## stopped after 100 iterations  
## # weights: 343  
## initial value 128.851552   
## iter 10 value 24.069127  
## iter 20 value 19.808241  
## iter 30 value 19.425147  
## iter 40 value 19.239768  
## iter 50 value 19.153846  
## iter 60 value 19.130637  
## iter 70 value 19.112686  
## iter 80 value 19.108156  
## iter 90 value 19.105634  
## iter 100 value 19.103654  
## final value 19.103654   
## stopped after 100 iterations  
## # weights: 361  
## initial value 155.314479   
## iter 10 value 27.122052  
## iter 20 value 19.927425  
## iter 30 value 19.356565  
## iter 40 value 19.165806  
## iter 50 value 19.119273  
## iter 60 value 19.097827  
## iter 70 value 19.096043  
## iter 80 value 19.095738  
## iter 90 value 19.095603  
## iter 100 value 19.095574  
## final value 19.095574   
## stopped after 100 iterations  
## # weights: 19  
## initial value 116.360918   
## iter 10 value 31.941296  
## iter 20 value 21.917628  
## iter 30 value 16.511720  
## iter 40 value 16.389421  
## iter 50 value 16.312872  
## iter 60 value 16.273204  
## iter 70 value 16.272858  
## iter 80 value 16.272373  
## iter 90 value 16.272153  
## final value 16.272024   
## converged  
## # weights: 37  
## initial value 121.905360   
## iter 10 value 33.345100  
## iter 20 value 18.103398  
## iter 30 value 14.248286  
## iter 40 value 12.485465  
## iter 50 value 9.707894  
## iter 60 value 8.225760  
## iter 70 value 8.184252  
## iter 80 value 8.152574  
## iter 90 value 7.264559  
## iter 100 value 7.231560  
## final value 7.231560   
## stopped after 100 iterations  
## # weights: 55  
## initial value 138.932546   
## iter 10 value 24.203591  
## iter 20 value 15.116167  
## iter 30 value 6.437389  
## iter 40 value 3.514772  
## iter 50 value 0.068680  
## iter 60 value 0.005116  
## iter 70 value 0.002370  
## iter 80 value 0.001663  
## iter 90 value 0.001235  
## iter 100 value 0.000899  
## final value 0.000899   
## stopped after 100 iterations  
## # weights: 73  
## initial value 135.993246   
## iter 10 value 34.150321  
## iter 20 value 8.880417  
## iter 30 value 4.943676  
## iter 40 value 4.795856  
## iter 50 value 4.780750  
## iter 60 value 4.780389  
## iter 70 value 4.780363  
## final value 4.780358   
## converged  
## # weights: 91  
## initial value 117.349304   
## iter 10 value 12.664460  
## iter 20 value 2.415749  
## iter 30 value 1.926465  
## iter 40 value 1.910041  
## iter 50 value 1.909616  
## iter 60 value 1.909574  
## final value 1.909547   
## converged  
## # weights: 109  
## initial value 120.281304   
## iter 10 value 20.624119  
## iter 20 value 10.311031  
## iter 30 value 7.751264  
## iter 40 value 6.928172  
## iter 50 value 5.850285  
## iter 60 value 3.886171  
## iter 70 value 3.279153  
## iter 80 value 2.533892  
## iter 90 value 2.521185  
## iter 100 value 2.512661  
## final value 2.512661   
## stopped after 100 iterations  
## # weights: 127  
## initial value 126.021366   
## iter 10 value 15.022623  
## iter 20 value 0.691522  
## iter 30 value 0.006652  
## iter 40 value 0.000141  
## final value 0.000067   
## converged  
## # weights: 145  
## initial value 149.173083   
## iter 10 value 16.850799  
## iter 20 value 3.133239  
## iter 30 value 0.048842  
## iter 40 value 0.000540  
## final value 0.000073   
## converged  
## # weights: 163  
## initial value 113.951102   
## iter 10 value 10.754285  
## iter 20 value 0.293495  
## iter 30 value 0.003299  
## iter 40 value 0.000131  
## iter 40 value 0.000085  
## iter 40 value 0.000084  
## final value 0.000084   
## converged  
## # weights: 181  
## initial value 134.224699   
## iter 10 value 14.683246  
## iter 20 value 1.090192  
## iter 30 value 0.003010  
## iter 40 value 0.000112  
## iter 40 value 0.000060  
## iter 40 value 0.000059  
## final value 0.000059   
## converged  
## # weights: 199  
## initial value 99.381721   
## iter 10 value 12.102339  
## iter 20 value 0.206909  
## iter 30 value 0.003486  
## final value 0.000093   
## converged  
## # weights: 217  
## initial value 130.743490   
## iter 10 value 13.771817  
## iter 20 value 0.691737  
## iter 30 value 0.005849  
## final value 0.000088   
## converged  
## # weights: 235  
## initial value 118.454509   
## iter 10 value 14.388921  
## iter 20 value 1.773937  
## iter 30 value 0.219875  
## iter 40 value 0.037486  
## iter 50 value 0.010271  
## iter 60 value 0.001052  
## iter 70 value 0.000641  
## iter 80 value 0.000367  
## iter 90 value 0.000140  
## iter 90 value 0.000097  
## iter 90 value 0.000097  
## final value 0.000097   
## converged  
## # weights: 253  
## initial value 133.879414   
## iter 10 value 11.526728  
## iter 20 value 0.659118  
## iter 30 value 0.007536  
## iter 40 value 0.000463  
## iter 50 value 0.000103  
## iter 50 value 0.000058  
## iter 50 value 0.000058  
## final value 0.000058   
## converged  
## # weights: 271  
## initial value 132.332682   
## iter 10 value 9.258982  
## iter 20 value 0.223685  
## iter 30 value 0.006858  
## iter 40 value 0.000650  
## iter 50 value 0.000174  
## final value 0.000095   
## converged  
## # weights: 289  
## initial value 126.605296   
## iter 10 value 16.350166  
## iter 20 value 1.550499  
## iter 30 value 0.033960  
## iter 40 value 0.000882  
## iter 50 value 0.000212  
## iter 60 value 0.000179  
## final value 0.000098   
## converged  
## # weights: 307  
## initial value 143.423148   
## iter 10 value 13.265058  
## iter 20 value 0.340201  
## iter 30 value 0.002522  
## final value 0.000088   
## converged  
## # weights: 325  
## initial value 254.448567   
## iter 10 value 7.078393  
## iter 20 value 0.055397  
## iter 30 value 0.002226  
## iter 40 value 0.000148  
## final value 0.000099   
## converged  
## # weights: 343  
## initial value 125.865642   
## iter 10 value 10.420225  
## iter 20 value 0.497318  
## iter 30 value 0.012888  
## iter 40 value 0.002343  
## iter 50 value 0.000177  
## final value 0.000097   
## converged  
## # weights: 361  
## initial value 116.378726   
## iter 10 value 13.107416  
## iter 20 value 0.164748  
## iter 30 value 0.001526  
## iter 40 value 0.000147  
## iter 40 value 0.000094  
## iter 40 value 0.000093  
## final value 0.000093   
## converged  
## # weights: 19  
## initial value 117.467416   
## iter 10 value 47.548096  
## iter 20 value 31.875194  
## iter 30 value 26.509080  
## iter 40 value 26.498425  
## iter 40 value 26.498425  
## final value 26.498425   
## converged  
## # weights: 37  
## initial value 128.242221   
## iter 10 value 30.419750  
## iter 20 value 21.381058  
## iter 30 value 19.923946  
## iter 40 value 19.606068  
## iter 50 value 19.596422  
## iter 60 value 19.591094  
## final value 19.590788   
## converged  
## # weights: 55  
## initial value 127.697757   
## iter 10 value 36.260244  
## iter 20 value 22.773322  
## iter 30 value 17.542727  
## iter 40 value 15.524848  
## iter 50 value 15.327343  
## iter 60 value 15.306367  
## iter 70 value 15.303742  
## iter 80 value 15.303270  
## final value 15.303268   
## converged  
## # weights: 73  
## initial value 117.191405   
## iter 10 value 23.327418  
## iter 20 value 16.950151  
## iter 30 value 15.385979  
## iter 40 value 15.123455  
## iter 50 value 14.878803  
## iter 60 value 14.798694  
## iter 70 value 14.785623  
## iter 80 value 14.785120  
## final value 14.785119   
## converged  
## # weights: 91  
## initial value 146.542445   
## iter 10 value 46.032205  
## iter 20 value 19.799161  
## iter 30 value 15.900497  
## iter 40 value 14.971398  
## iter 50 value 14.842090  
## iter 60 value 14.802961  
## iter 70 value 14.802249  
## iter 80 value 14.801763  
## final value 14.801748   
## converged  
## # weights: 109  
## initial value 134.623797   
## iter 10 value 37.027415  
## iter 20 value 18.546226  
## iter 30 value 14.695197  
## iter 40 value 13.795461  
## iter 50 value 13.742890  
## iter 60 value 13.517135  
## iter 70 value 13.448752  
## iter 80 value 13.439524  
## iter 90 value 13.439383  
## iter 90 value 13.439382  
## iter 90 value 13.439382  
## final value 13.439382   
## converged  
## # weights: 127  
## initial value 122.585372   
## iter 10 value 28.363614  
## iter 20 value 18.923997  
## iter 30 value 15.580791  
## iter 40 value 14.133156  
## iter 50 value 13.703786  
## iter 60 value 13.356202  
## iter 70 value 13.317587  
## iter 80 value 13.296950  
## iter 90 value 13.293275  
## iter 100 value 13.293075  
## final value 13.293075   
## stopped after 100 iterations  
## # weights: 145  
## initial value 128.672697   
## iter 10 value 25.093405  
## iter 20 value 16.268130  
## iter 30 value 14.183270  
## iter 40 value 13.818481  
## iter 50 value 13.479491  
## iter 60 value 13.347885  
## iter 70 value 13.291586  
## iter 80 value 13.283189  
## iter 90 value 13.278450  
## iter 100 value 13.271472  
## final value 13.271472   
## stopped after 100 iterations  
## # weights: 163  
## initial value 131.927293   
## iter 10 value 24.307794  
## iter 20 value 17.266541  
## iter 30 value 15.169620  
## iter 40 value 14.294430  
## iter 50 value 13.764030  
## iter 60 value 13.608864  
## iter 70 value 13.495635  
## iter 80 value 13.365898  
## iter 90 value 13.335286  
## iter 100 value 13.332203  
## final value 13.332203   
## stopped after 100 iterations  
## # weights: 181  
## initial value 112.352474   
## iter 10 value 31.474423  
## iter 20 value 18.635689  
## iter 30 value 15.199123  
## iter 40 value 14.491808  
## iter 50 value 14.023927  
## iter 60 value 13.858640  
## iter 70 value 13.788002  
## iter 80 value 13.637983  
## iter 90 value 13.392979  
## iter 100 value 13.258672  
## final value 13.258672   
## stopped after 100 iterations  
## # weights: 199  
## initial value 117.190589   
## iter 10 value 33.698475  
## iter 20 value 18.797723  
## iter 30 value 15.040351  
## iter 40 value 13.780053  
## iter 50 value 13.348954  
## iter 60 value 13.251172  
## iter 70 value 13.172315  
## iter 80 value 13.142380  
## iter 90 value 13.114088  
## iter 100 value 13.096615  
## final value 13.096615   
## stopped after 100 iterations  
## # weights: 217  
## initial value 172.704598   
## iter 10 value 20.265460  
## iter 20 value 14.324544  
## iter 30 value 13.496060  
## iter 40 value 13.276783  
## iter 50 value 13.189506  
## iter 60 value 13.179490  
## iter 70 value 13.174449  
## iter 80 value 13.170176  
## iter 90 value 13.166236  
## iter 100 value 13.162120  
## final value 13.162120   
## stopped after 100 iterations  
## # weights: 235  
## initial value 142.809457   
## iter 10 value 23.696683  
## iter 20 value 16.808191  
## iter 30 value 14.079577  
## iter 40 value 13.755485  
## iter 50 value 13.462587  
## iter 60 value 13.300138  
## iter 70 value 13.241289  
## iter 80 value 13.219406  
## iter 90 value 13.209544  
## iter 100 value 13.202414  
## final value 13.202414   
## stopped after 100 iterations  
## # weights: 253  
## initial value 122.459041   
## iter 10 value 21.207522  
## iter 20 value 15.225544  
## iter 30 value 13.886849  
## iter 40 value 13.600713  
## iter 50 value 13.534496  
## iter 60 value 13.364085  
## iter 70 value 13.258463  
## iter 80 value 13.219546  
## iter 90 value 13.207056  
## iter 100 value 13.200609  
## final value 13.200609   
## stopped after 100 iterations  
## # weights: 271  
## initial value 155.291557   
## iter 10 value 25.852245  
## iter 20 value 15.151096  
## iter 30 value 13.658041  
## iter 40 value 13.268223  
## iter 50 value 13.209320  
## iter 60 value 13.204127  
## iter 70 value 13.200754  
## iter 80 value 13.199043  
## iter 90 value 13.198098  
## iter 100 value 13.197474  
## final value 13.197474   
## stopped after 100 iterations  
## # weights: 289  
## initial value 161.211695   
## iter 10 value 19.901385  
## iter 20 value 14.824067  
## iter 30 value 13.647128  
## iter 40 value 13.263114  
## iter 50 value 13.190648  
## iter 60 value 13.162520  
## iter 70 value 13.155636  
## iter 80 value 13.153180  
## iter 90 value 13.150781  
## iter 100 value 13.122797  
## final value 13.122797   
## stopped after 100 iterations  
## # weights: 307  
## initial value 125.096757   
## iter 10 value 22.301614  
## iter 20 value 15.064759  
## iter 30 value 13.784577  
## iter 40 value 13.299733  
## iter 50 value 13.142310  
## iter 60 value 13.094242  
## iter 70 value 13.021850  
## iter 80 value 12.981970  
## iter 90 value 12.971519  
## iter 100 value 12.968649  
## final value 12.968649   
## stopped after 100 iterations  
## # weights: 325  
## initial value 152.960127   
## iter 10 value 32.911402  
## iter 20 value 17.073205  
## iter 30 value 14.300262  
## iter 40 value 13.534615  
## iter 50 value 13.282686  
## iter 60 value 13.213261  
## iter 70 value 13.190230  
## iter 80 value 13.178516  
## iter 90 value 13.172344  
## iter 100 value 13.168929  
## final value 13.168929   
## stopped after 100 iterations  
## # weights: 343  
## initial value 140.855201   
## iter 10 value 39.105454  
## iter 20 value 19.852825  
## iter 30 value 14.817641  
## iter 40 value 13.949879  
## iter 50 value 13.520293  
## iter 60 value 13.240110  
## iter 70 value 13.167955  
## iter 80 value 13.141825  
## iter 90 value 13.125807  
## iter 100 value 13.117334  
## final value 13.117334   
## stopped after 100 iterations  
## # weights: 361  
## initial value 181.693394   
## iter 10 value 34.708362  
## iter 20 value 19.975680  
## iter 30 value 15.103609  
## iter 40 value 13.782057  
## iter 50 value 13.328045  
## iter 60 value 13.224491  
## iter 70 value 13.119714  
## iter 80 value 13.040823  
## iter 90 value 13.005653  
## iter 100 value 13.000286  
## final value 13.000286   
## stopped after 100 iterations  
## # weights: 19  
## initial value 126.030984   
## iter 10 value 61.345736  
## iter 20 value 34.895482  
## iter 30 value 30.860901  
## iter 40 value 30.798640  
## iter 50 value 30.797995  
## iter 60 value 30.797952  
## final value 30.797952   
## converged  
## # weights: 37  
## initial value 109.944765   
## iter 10 value 32.439805  
## iter 20 value 27.093978  
## iter 30 value 25.611397  
## iter 40 value 25.548647  
## final value 25.548486   
## converged  
## # weights: 55  
## initial value 121.197847   
## iter 10 value 34.109459  
## iter 20 value 25.349677  
## iter 30 value 22.849008  
## iter 40 value 21.817579  
## iter 50 value 21.773650  
## iter 60 value 21.772044  
## final value 21.772039   
## converged  
## # weights: 73  
## initial value 129.524251   
## iter 10 value 43.001357  
## iter 20 value 24.889669  
## iter 30 value 23.170320  
## iter 40 value 22.622666  
## iter 50 value 22.429053  
## iter 60 value 22.427839  
## final value 22.427821   
## converged  
## # weights: 91  
## initial value 131.430292   
## iter 10 value 31.348332  
## iter 20 value 23.408446  
## iter 30 value 21.545140  
## iter 40 value 21.127053  
## iter 50 value 20.874119  
## iter 60 value 20.767322  
## iter 70 value 20.750094  
## iter 80 value 20.745583  
## iter 90 value 20.742863  
## iter 100 value 20.738362  
## final value 20.738362   
## stopped after 100 iterations  
## # weights: 109  
## initial value 115.756589   
## iter 10 value 35.091307  
## iter 20 value 22.340438  
## iter 30 value 21.006658  
## iter 40 value 20.884924  
## iter 50 value 20.859931  
## iter 60 value 20.858750  
## iter 70 value 20.858700  
## iter 80 value 20.858648  
## final value 20.858647   
## converged  
## # weights: 127  
## initial value 100.757651   
## iter 10 value 31.906659  
## iter 20 value 22.070459  
## iter 30 value 20.777431  
## iter 40 value 20.582068  
## iter 50 value 20.532379  
## iter 60 value 20.526526  
## iter 70 value 20.525579  
## iter 80 value 20.525507  
## iter 80 value 20.525507  
## iter 80 value 20.525507  
## final value 20.525507   
## converged  
## # weights: 145  
## initial value 109.961155   
## iter 10 value 27.959444  
## iter 20 value 21.857191  
## iter 30 value 20.880960  
## iter 40 value 20.425628  
## iter 50 value 20.340545  
## iter 60 value 20.299716  
## iter 70 value 20.293793  
## iter 80 value 20.288193  
## iter 90 value 20.281309  
## iter 100 value 20.280233  
## final value 20.280233   
## stopped after 100 iterations  
## # weights: 163  
## initial value 131.569215   
## iter 10 value 26.032138  
## iter 20 value 21.300273  
## iter 30 value 20.440218  
## iter 40 value 20.225323  
## iter 50 value 20.165608  
## iter 60 value 20.145073  
## iter 70 value 20.139981  
## iter 80 value 20.138872  
## iter 90 value 20.138750  
## iter 100 value 20.138735  
## final value 20.138735   
## stopped after 100 iterations  
## # weights: 181  
## initial value 120.400739   
## iter 10 value 23.952770  
## iter 20 value 20.921741  
## iter 30 value 20.313245  
## iter 40 value 20.123965  
## iter 50 value 20.093086  
## iter 60 value 20.072373  
## iter 70 value 20.054188  
## iter 80 value 20.052750  
## iter 90 value 20.052574  
## iter 100 value 20.052536  
## final value 20.052536   
## stopped after 100 iterations  
## # weights: 199  
## initial value 107.440511   
## iter 10 value 26.532130  
## iter 20 value 21.735134  
## iter 30 value 20.845209  
## iter 40 value 20.461545  
## iter 50 value 20.128982  
## iter 60 value 20.053331  
## iter 70 value 20.035741  
## iter 80 value 20.034303  
## iter 90 value 20.034070  
## iter 100 value 20.033883  
## final value 20.033883   
## stopped after 100 iterations  
## # weights: 217  
## initial value 164.912187   
## iter 10 value 31.095227  
## iter 20 value 21.503775  
## iter 30 value 20.292033  
## iter 40 value 20.098648  
## iter 50 value 20.077427  
## iter 60 value 20.071837  
## iter 70 value 20.069656  
## iter 80 value 20.068636  
## iter 90 value 20.067888  
## iter 100 value 20.065090  
## final value 20.065090   
## stopped after 100 iterations  
## # weights: 235  
## initial value 123.787526   
## iter 10 value 27.321642  
## iter 20 value 21.329607  
## iter 30 value 20.371138  
## iter 40 value 20.155267  
## iter 50 value 20.015694  
## iter 60 value 19.994575  
## iter 70 value 19.988751  
## iter 80 value 19.987969  
## iter 90 value 19.987852  
## iter 100 value 19.987815  
## final value 19.987815   
## stopped after 100 iterations  
## # weights: 253  
## initial value 131.349997   
## iter 10 value 33.042478  
## iter 20 value 22.424959  
## iter 30 value 20.389393  
## iter 40 value 20.168282  
## iter 50 value 20.126878  
## iter 60 value 20.110189  
## iter 70 value 20.091424  
## iter 80 value 20.088650  
## iter 90 value 20.088307  
## iter 100 value 20.088230  
## final value 20.088230   
## stopped after 100 iterations  
## # weights: 271  
## initial value 127.371754   
## iter 10 value 24.320640  
## iter 20 value 20.871721  
## iter 30 value 20.322872  
## iter 40 value 20.113019  
## iter 50 value 20.084812  
## iter 60 value 20.079933  
## iter 70 value 20.079023  
## iter 80 value 20.078563  
## iter 90 value 20.078286  
## iter 100 value 20.078206  
## final value 20.078206   
## stopped after 100 iterations  
## # weights: 289  
## initial value 142.491713   
## iter 10 value 25.572772  
## iter 20 value 21.262660  
## iter 30 value 20.496430  
## iter 40 value 20.173622  
## iter 50 value 20.004179  
## iter 60 value 19.978078  
## iter 70 value 19.951241  
## iter 80 value 19.926678  
## iter 90 value 19.911300  
## iter 100 value 19.907492  
## final value 19.907492   
## stopped after 100 iterations  
## # weights: 307  
## initial value 136.581311   
## iter 10 value 26.950286  
## iter 20 value 21.177495  
## iter 30 value 20.390116  
## iter 40 value 20.164901  
## iter 50 value 20.086851  
## iter 60 value 20.047824  
## iter 70 value 20.037703  
## iter 80 value 20.032449  
## iter 90 value 20.017552  
## iter 100 value 20.015780  
## final value 20.015780   
## stopped after 100 iterations  
## # weights: 325  
## initial value 126.119504   
## iter 10 value 31.494532  
## iter 20 value 22.111674  
## iter 30 value 20.465641  
## iter 40 value 20.169875  
## iter 50 value 20.090789  
## iter 60 value 20.061967  
## iter 70 value 20.054612  
## iter 80 value 20.034240  
## iter 90 value 20.025804  
## iter 100 value 20.022554  
## final value 20.022554   
## stopped after 100 iterations  
## # weights: 343  
## initial value 116.184230   
## iter 10 value 28.271446  
## iter 20 value 21.524509  
## iter 30 value 20.455545  
## iter 40 value 19.998847  
## iter 50 value 19.915999  
## iter 60 value 19.887039  
## iter 70 value 19.878374  
## iter 80 value 19.876332  
## iter 90 value 19.876060  
## iter 100 value 19.875808  
## final value 19.875808   
## stopped after 100 iterations  
## # weights: 361  
## initial value 123.826615   
## iter 10 value 36.165177  
## iter 20 value 22.312774  
## iter 30 value 20.813418  
## iter 40 value 20.242805  
## iter 50 value 20.018325  
## iter 60 value 19.941435  
## iter 70 value 19.896262  
## iter 80 value 19.880603  
## iter 90 value 19.878291  
## iter 100 value 19.877488  
## final value 19.877488   
## stopped after 100 iterations  
## # weights: 19  
## initial value 120.218231   
## iter 10 value 41.644966  
## iter 20 value 23.062165  
## iter 30 value 13.475848  
## iter 40 value 13.093929  
## iter 50 value 13.053854  
## iter 60 value 13.051466  
## iter 70 value 13.050887  
## iter 80 value 13.050326  
## iter 90 value 13.050119  
## iter 100 value 13.049934  
## final value 13.049934   
## stopped after 100 iterations  
## # weights: 37  
## initial value 116.781845   
## iter 10 value 24.040495  
## iter 20 value 16.079279  
## iter 30 value 11.490939  
## iter 40 value 9.546869  
## iter 50 value 9.500078  
## iter 60 value 9.498968  
## final value 9.498963   
## converged  
## # weights: 55  
## initial value 119.329567   
## iter 10 value 15.431687  
## iter 20 value 8.843733  
## iter 30 value 1.661794  
## iter 40 value 0.058728  
## iter 50 value 0.021205  
## iter 60 value 0.009962  
## iter 70 value 0.006335  
## iter 80 value 0.003585  
## iter 90 value 0.001931  
## iter 100 value 0.001229  
## final value 0.001229   
## stopped after 100 iterations  
## # weights: 73  
## initial value 121.979617   
## iter 10 value 19.162263  
## iter 20 value 3.598278  
## iter 30 value 0.093253  
## iter 40 value 0.002063  
## final value 0.000071   
## converged  
## # weights: 91  
## initial value 119.310561   
## iter 10 value 17.359305  
## iter 20 value 2.052999  
## iter 30 value 0.030516  
## iter 40 value 0.000118  
## iter 40 value 0.000061  
## iter 40 value 0.000061  
## final value 0.000061   
## converged  
## # weights: 109  
## initial value 124.054874   
## iter 10 value 15.896605  
## iter 20 value 1.004287  
## iter 30 value 0.009494  
## iter 40 value 0.000192  
## final value 0.000095   
## converged  
## # weights: 127  
## initial value 124.455240   
## iter 10 value 13.160241  
## iter 20 value 0.847403  
## iter 30 value 0.032586  
## iter 40 value 0.000199  
## final value 0.000070   
## converged  
## # weights: 145  
## initial value 113.705470   
## iter 10 value 16.675055  
## iter 20 value 0.716515  
## iter 30 value 0.005347  
## iter 40 value 0.000270  
## final value 0.000100   
## converged  
## # weights: 163  
## initial value 128.675261   
## iter 10 value 10.619942  
## iter 20 value 0.339841  
## iter 30 value 0.006540  
## iter 40 value 0.000190  
## final value 0.000099   
## converged  
## # weights: 181  
## initial value 106.603374   
## iter 10 value 10.577883  
## iter 20 value 0.163101  
## iter 30 value 0.002999  
## final value 0.000056   
## converged  
## # weights: 199  
## initial value 202.251220   
## iter 10 value 7.248269  
## iter 20 value 0.671724  
## iter 30 value 0.019068  
## iter 40 value 0.001714  
## iter 50 value 0.000548  
## iter 60 value 0.000245  
## final value 0.000097   
## converged  
## # weights: 217  
## initial value 116.642195   
## iter 10 value 8.285603  
## iter 20 value 0.189271  
## iter 30 value 0.002820  
## final value 0.000075   
## converged  
## # weights: 235  
## initial value 113.951548   
## iter 10 value 13.640929  
## iter 20 value 0.433709  
## iter 30 value 0.008847  
## iter 40 value 0.000221  
## iter 50 value 0.000102  
## final value 0.000098   
## converged  
## # weights: 253  
## initial value 115.810528   
## iter 10 value 9.932005  
## iter 20 value 0.374417  
## iter 30 value 0.007106  
## iter 40 value 0.000252  
## final value 0.000078   
## converged  
## # weights: 271  
## initial value 111.694755   
## iter 10 value 10.428902  
## iter 20 value 0.687629  
## iter 30 value 0.022162  
## iter 40 value 0.002123  
## iter 50 value 0.000435  
## final value 0.000084   
## converged  
## # weights: 289  
## initial value 148.667654   
## iter 10 value 8.898520  
## iter 20 value 0.207378  
## iter 30 value 0.006669  
## iter 40 value 0.000826  
## iter 50 value 0.000152  
## final value 0.000091   
## converged  
## # weights: 307  
## initial value 121.280429   
## iter 10 value 11.419639  
## iter 20 value 0.149216  
## iter 30 value 0.000441  
## final value 0.000061   
## converged  
## # weights: 325  
## initial value 168.505489   
## iter 10 value 14.962740  
## iter 20 value 0.869363  
## iter 30 value 0.007086  
## iter 40 value 0.000481  
## final value 0.000100   
## converged  
## # weights: 343  
## initial value 105.800525   
## iter 10 value 10.287970  
## iter 20 value 0.662426  
## iter 30 value 0.010462  
## iter 40 value 0.002402  
## iter 50 value 0.000382  
## final value 0.000090   
## converged  
## # weights: 361  
## initial value 146.272501   
## iter 10 value 8.062379  
## iter 20 value 0.147673  
## iter 30 value 0.003374  
## iter 40 value 0.000842  
## iter 50 value 0.000107  
## iter 50 value 0.000089  
## iter 50 value 0.000088  
## final value 0.000088   
## converged  
## # weights: 19  
## initial value 120.725817   
## iter 10 value 39.950651  
## iter 20 value 23.381628  
## iter 30 value 22.827482  
## final value 22.827471   
## converged  
## # weights: 37  
## initial value 123.833183   
## iter 10 value 35.267090  
## iter 20 value 25.872796  
## iter 30 value 22.290855  
## iter 40 value 21.239208  
## iter 50 value 19.380151  
## iter 60 value 19.138572  
## iter 70 value 19.123466  
## iter 80 value 19.123266  
## final value 19.123262   
## converged  
## # weights: 55  
## initial value 113.793244   
## iter 10 value 25.391647  
## iter 20 value 16.595705  
## iter 30 value 15.077026  
## iter 40 value 14.564205  
## iter 50 value 14.495365  
## iter 60 value 14.456822  
## iter 70 value 14.456060  
## final value 14.456057   
## converged  
## # weights: 73  
## initial value 108.583012   
## iter 10 value 25.245821  
## iter 20 value 18.112260  
## iter 30 value 15.390709  
## iter 40 value 14.642711  
## iter 50 value 14.039373  
## iter 60 value 13.791208  
## iter 70 value 13.784134  
## iter 80 value 13.783633  
## iter 90 value 13.783546  
## iter 100 value 13.783294  
## final value 13.783294   
## stopped after 100 iterations  
## # weights: 91  
## initial value 108.451618   
## iter 10 value 23.539098  
## iter 20 value 17.695013  
## iter 30 value 15.244584  
## iter 40 value 14.350039  
## iter 50 value 14.051361  
## iter 60 value 13.908479  
## iter 70 value 13.777021  
## iter 80 value 13.649835  
## iter 90 value 13.623841  
## iter 100 value 13.619264  
## final value 13.619264   
## stopped after 100 iterations  
## # weights: 109  
## initial value 139.197061   
## iter 10 value 22.646598  
## iter 20 value 16.573358  
## iter 30 value 14.532962  
## iter 40 value 13.954137  
## iter 50 value 13.401774  
## iter 60 value 13.149185  
## iter 70 value 13.045846  
## iter 80 value 13.015619  
## iter 90 value 13.014911  
## iter 100 value 13.014888  
## final value 13.014888   
## stopped after 100 iterations  
## # weights: 127  
## initial value 128.483457   
## iter 10 value 24.844160  
## iter 20 value 16.416085  
## iter 30 value 14.052842  
## iter 40 value 13.310942  
## iter 50 value 13.080885  
## iter 60 value 12.969727  
## iter 70 value 12.946466  
## iter 80 value 12.935172  
## iter 90 value 12.930345  
## iter 100 value 12.928114  
## final value 12.928114   
## stopped after 100 iterations  
## # weights: 145  
## initial value 121.311493   
## iter 10 value 20.418011  
## iter 20 value 14.462260  
## iter 30 value 13.179529  
## iter 40 value 13.040652  
## iter 50 value 13.011183  
## iter 60 value 12.982011  
## iter 70 value 12.979616  
## iter 80 value 12.979198  
## iter 90 value 12.979078  
## final value 12.979070   
## converged  
## # weights: 163  
## initial value 113.619660   
## iter 10 value 23.255002  
## iter 20 value 14.634431  
## iter 30 value 13.406445  
## iter 40 value 13.120115  
## iter 50 value 12.924389  
## iter 60 value 12.875724  
## iter 70 value 12.851247  
## iter 80 value 12.829867  
## iter 90 value 12.827895  
## iter 100 value 12.827748  
## final value 12.827748   
## stopped after 100 iterations  
## # weights: 181  
## initial value 114.089898   
## iter 10 value 23.773626  
## iter 20 value 14.360602  
## iter 30 value 13.128562  
## iter 40 value 12.871836  
## iter 50 value 12.814241  
## iter 60 value 12.776671  
## iter 70 value 12.769238  
## iter 80 value 12.759136  
## iter 90 value 12.754091  
## iter 100 value 12.751614  
## final value 12.751614   
## stopped after 100 iterations  
## # weights: 199  
## initial value 133.733406   
## iter 10 value 19.281998  
## iter 20 value 13.982482  
## iter 30 value 13.247538  
## iter 40 value 13.087900  
## iter 50 value 13.010256  
## iter 60 value 12.961899  
## iter 70 value 12.935511  
## iter 80 value 12.923649  
## iter 90 value 12.832910  
## iter 100 value 12.805729  
## final value 12.805729   
## stopped after 100 iterations  
## # weights: 217  
## initial value 150.809265   
## iter 10 value 20.250175  
## iter 20 value 14.145203  
## iter 30 value 13.210941  
## iter 40 value 13.003964  
## iter 50 value 12.848992  
## iter 60 value 12.804675  
## iter 70 value 12.797057  
## iter 80 value 12.795600  
## iter 90 value 12.778380  
## iter 100 value 12.772137  
## final value 12.772137   
## stopped after 100 iterations  
## # weights: 235  
## initial value 109.256383   
## iter 10 value 20.902983  
## iter 20 value 14.447713  
## iter 30 value 13.124405  
## iter 40 value 12.901218  
## iter 50 value 12.820835  
## iter 60 value 12.796379  
## iter 70 value 12.767838  
## iter 80 value 12.744915  
## iter 90 value 12.740826  
## iter 100 value 12.731089  
## final value 12.731089   
## stopped after 100 iterations  
## # weights: 253  
## initial value 133.907945   
## iter 10 value 25.807688  
## iter 20 value 15.385729  
## iter 30 value 13.829423  
## iter 40 value 13.115156  
## iter 50 value 12.833293  
## iter 60 value 12.761068  
## iter 70 value 12.733438  
## iter 80 value 12.728861  
## iter 90 value 12.726517  
## iter 100 value 12.723588  
## final value 12.723588   
## stopped after 100 iterations  
## # weights: 271  
## initial value 175.934677   
## iter 10 value 22.858472  
## iter 20 value 14.780047  
## iter 30 value 13.628009  
## iter 40 value 13.101627  
## iter 50 value 12.965350  
## iter 60 value 12.829318  
## iter 70 value 12.757636  
## iter 80 value 12.710083  
## iter 90 value 12.688842  
## iter 100 value 12.676732  
## final value 12.676732   
## stopped after 100 iterations  
## # weights: 289  
## initial value 123.503291   
## iter 10 value 18.869153  
## iter 20 value 13.584693  
## iter 30 value 12.974007  
## iter 40 value 12.806520  
## iter 50 value 12.716444  
## iter 60 value 12.695753  
## iter 70 value 12.686740  
## iter 80 value 12.684108  
## iter 90 value 12.682498  
## iter 100 value 12.682011  
## final value 12.682011   
## stopped after 100 iterations  
## # weights: 307  
## initial value 146.467895   
## iter 10 value 19.471343  
## iter 20 value 13.720797  
## iter 30 value 13.047658  
## iter 40 value 12.822427  
## iter 50 value 12.705283  
## iter 60 value 12.649472  
## iter 70 value 12.636055  
## iter 80 value 12.631632  
## iter 90 value 12.629282  
## iter 100 value 12.628505  
## final value 12.628505   
## stopped after 100 iterations  
## # weights: 325  
## initial value 147.742505   
## iter 10 value 23.154660  
## iter 20 value 15.416417  
## iter 30 value 13.419590  
## iter 40 value 13.006474  
## iter 50 value 12.803102  
## iter 60 value 12.713273  
## iter 70 value 12.678481  
## iter 80 value 12.653782  
## iter 90 value 12.644600  
## iter 100 value 12.638109  
## final value 12.638109   
## stopped after 100 iterations  
## # weights: 343  
## initial value 166.356891   
## iter 10 value 20.550993  
## iter 20 value 14.455219  
## iter 30 value 13.163378  
## iter 40 value 12.890853  
## iter 50 value 12.852583  
## iter 60 value 12.846356  
## iter 70 value 12.844681  
## iter 80 value 12.843735  
## iter 90 value 12.843423  
## iter 100 value 12.843337  
## final value 12.843337   
## stopped after 100 iterations  
## # weights: 361  
## initial value 201.254504   
## iter 10 value 26.650852  
## iter 20 value 17.531568  
## iter 30 value 14.077630  
## iter 40 value 13.110261  
## iter 50 value 12.818375  
## iter 60 value 12.711824  
## iter 70 value 12.659098  
## iter 80 value 12.644312  
## iter 90 value 12.633302  
## iter 100 value 12.624316  
## final value 12.624316   
## stopped after 100 iterations  
## # weights: 19  
## initial value 126.631459   
## iter 10 value 30.188953  
## iter 20 value 28.952977  
## final value 28.951951   
## converged  
## # weights: 37  
## initial value 128.629423   
## iter 10 value 40.679818  
## iter 20 value 28.648068  
## iter 30 value 24.021077  
## iter 40 value 23.065275  
## iter 50 value 22.871793  
## iter 60 value 22.857026  
## iter 70 value 22.856984  
## final value 22.856983   
## converged  
## # weights: 55  
## initial value 118.031754   
## iter 10 value 52.125621  
## iter 20 value 23.873803  
## iter 30 value 22.063060  
## iter 40 value 21.036323  
## iter 50 value 20.763723  
## iter 60 value 20.758859  
## iter 70 value 20.758418  
## final value 20.758414   
## converged  
## # weights: 73  
## initial value 122.587440   
## iter 10 value 26.292543  
## iter 20 value 21.068680  
## iter 30 value 20.379853  
## iter 40 value 20.307448  
## iter 50 value 20.299536  
## iter 60 value 20.298481  
## final value 20.298477   
## converged  
## # weights: 91  
## initial value 150.255584   
## iter 10 value 32.792994  
## iter 20 value 24.277537  
## iter 30 value 21.737840  
## iter 40 value 21.156009  
## iter 50 value 20.741948  
## iter 60 value 20.303795  
## iter 70 value 20.122207  
## iter 80 value 20.059590  
## iter 90 value 20.039793  
## iter 100 value 19.955963  
## final value 19.955963   
## stopped after 100 iterations  
## # weights: 109  
## initial value 127.607316   
## iter 10 value 32.303070  
## iter 20 value 24.253408  
## iter 30 value 21.804394  
## iter 40 value 20.711336  
## iter 50 value 20.197356  
## iter 60 value 19.948842  
## iter 70 value 19.893085  
## iter 80 value 19.887604  
## iter 90 value 19.887026  
## final value 19.887006   
## converged  
## # weights: 127  
## initial value 142.382611   
## iter 10 value 39.944056  
## iter 20 value 21.528660  
## iter 30 value 20.408106  
## iter 40 value 19.869409  
## iter 50 value 19.648312  
## iter 60 value 19.624428  
## iter 70 value 19.621731  
## iter 80 value 19.621500  
## iter 90 value 19.621484  
## iter 100 value 19.621477  
## final value 19.621477   
## stopped after 100 iterations  
## # weights: 145  
## initial value 129.143880   
## iter 10 value 26.638693  
## iter 20 value 20.869229  
## iter 30 value 19.969976  
## iter 40 value 19.722777  
## iter 50 value 19.613825  
## iter 60 value 19.515977  
## iter 70 value 19.480402  
## iter 80 value 19.473813  
## iter 90 value 19.471670  
## iter 100 value 19.471453  
## final value 19.471453   
## stopped after 100 iterations  
## # weights: 163  
## initial value 168.069147   
## iter 10 value 29.057004  
## iter 20 value 20.811939  
## iter 30 value 19.938602  
## iter 40 value 19.755114  
## iter 50 value 19.620281  
## iter 60 value 19.575738  
## iter 70 value 19.570556  
## iter 80 value 19.569320  
## iter 90 value 19.569075  
## iter 100 value 19.569058  
## final value 19.569058   
## stopped after 100 iterations  
## # weights: 181  
## initial value 139.420946   
## iter 10 value 28.454105  
## iter 20 value 22.089237  
## iter 30 value 20.680424  
## iter 40 value 19.700752  
## iter 50 value 19.436227  
## iter 60 value 19.345187  
## iter 70 value 19.326746  
## iter 80 value 19.303510  
## iter 90 value 19.292039  
## iter 100 value 19.287036  
## final value 19.287036   
## stopped after 100 iterations  
## # weights: 199  
## initial value 128.257993   
## iter 10 value 32.760889  
## iter 20 value 22.653712  
## iter 30 value 20.289715  
## iter 40 value 19.877864  
## iter 50 value 19.704744  
## iter 60 value 19.640581  
## iter 70 value 19.606464  
## iter 80 value 19.590803  
## iter 90 value 19.586897  
## iter 100 value 19.586500  
## final value 19.586500   
## stopped after 100 iterations  
## # weights: 217  
## initial value 146.390297   
## iter 10 value 33.659752  
## iter 20 value 23.253424  
## iter 30 value 20.721940  
## iter 40 value 20.028902  
## iter 50 value 19.720148  
## iter 60 value 19.436202  
## iter 70 value 19.380470  
## iter 80 value 19.359899  
## iter 90 value 19.335973  
## iter 100 value 19.329601  
## final value 19.329601   
## stopped after 100 iterations  
## # weights: 235  
## initial value 137.950990   
## iter 10 value 28.198381  
## iter 20 value 20.429642  
## iter 30 value 19.662153  
## iter 40 value 19.413033  
## iter 50 value 19.365574  
## iter 60 value 19.352217  
## iter 70 value 19.347747  
## iter 80 value 19.346970  
## iter 90 value 19.346831  
## final value 19.346817   
## converged  
## # weights: 253  
## initial value 119.175260   
## iter 10 value 24.360966  
## iter 20 value 20.026989  
## iter 30 value 19.552894  
## iter 40 value 19.379728  
## iter 50 value 19.353237  
## iter 60 value 19.341194  
## iter 70 value 19.329971  
## iter 80 value 19.323654  
## iter 90 value 19.322458  
## iter 100 value 19.322058  
## final value 19.322058   
## stopped after 100 iterations  
## # weights: 271  
## initial value 110.263658   
## iter 10 value 26.524178  
## iter 20 value 20.348321  
## iter 30 value 19.626911  
## iter 40 value 19.396441  
## iter 50 value 19.341946  
## iter 60 value 19.329731  
## iter 70 value 19.328268  
## iter 80 value 19.327403  
## iter 90 value 19.319763  
## iter 100 value 19.313515  
## final value 19.313515   
## stopped after 100 iterations  
## # weights: 289  
## initial value 141.742537   
## iter 10 value 24.855826  
## iter 20 value 20.387917  
## iter 30 value 19.716229  
## iter 40 value 19.494037  
## iter 50 value 19.391989  
## iter 60 value 19.347591  
## iter 70 value 19.320278  
## iter 80 value 19.313791  
## iter 90 value 19.312654  
## iter 100 value 19.312169  
## final value 19.312169   
## stopped after 100 iterations  
## # weights: 307  
## initial value 143.232441   
## iter 10 value 36.355549  
## iter 20 value 22.265309  
## iter 30 value 19.914811  
## iter 40 value 19.437847  
## iter 50 value 19.328466  
## iter 60 value 19.237072  
## iter 70 value 19.205751  
## iter 80 value 19.192670  
## iter 90 value 19.190165  
## iter 100 value 19.187405  
## final value 19.187405   
## stopped after 100 iterations  
## # weights: 325  
## initial value 162.073830   
## iter 10 value 29.554091  
## iter 20 value 21.532118  
## iter 30 value 20.191152  
## iter 40 value 19.638833  
## iter 50 value 19.419828  
## iter 60 value 19.366254  
## iter 70 value 19.343614  
## iter 80 value 19.310576  
## iter 90 value 19.259379  
## iter 100 value 19.200800  
## final value 19.200800   
## stopped after 100 iterations  
## # weights: 343  
## initial value 112.426172   
## iter 10 value 25.203188  
## iter 20 value 19.932700  
## iter 30 value 19.431964  
## iter 40 value 19.287008  
## iter 50 value 19.233099  
## iter 60 value 19.197043  
## iter 70 value 19.181087  
## iter 80 value 19.179766  
## iter 90 value 19.179110  
## iter 100 value 19.178969  
## final value 19.178969   
## stopped after 100 iterations  
## # weights: 361  
## initial value 128.426656   
## iter 10 value 24.420224  
## iter 20 value 20.240578  
## iter 30 value 19.602555  
## iter 40 value 19.369923  
## iter 50 value 19.306468  
## iter 60 value 19.293079  
## iter 70 value 19.288903  
## iter 80 value 19.287397  
## iter 90 value 19.286141  
## iter 100 value 19.285821  
## final value 19.285821   
## stopped after 100 iterations  
## # weights: 19  
## initial value 129.255533   
## iter 10 value 39.994676  
## iter 20 value 15.517005  
## iter 30 value 13.079464  
## iter 40 value 13.049783  
## iter 50 value 13.049715  
## final value 13.049629   
## converged  
## # weights: 37  
## initial value 120.040848   
## iter 10 value 23.648409  
## iter 20 value 13.112337  
## iter 30 value 12.239893  
## iter 40 value 12.224853  
## iter 50 value 12.223929  
## final value 12.223927   
## converged  
## # weights: 55  
## initial value 127.566981   
## iter 10 value 38.895648  
## iter 20 value 4.986160  
## iter 30 value 1.684118  
## iter 40 value 1.412435  
## iter 50 value 1.393646  
## iter 60 value 1.387592  
## iter 70 value 1.386472  
## iter 80 value 1.386370  
## iter 90 value 1.386338  
## final value 1.386336   
## converged  
## # weights: 73  
## initial value 127.441073   
## iter 10 value 20.752139  
## iter 20 value 9.627861  
## iter 30 value 7.675023  
## iter 40 value 7.434160  
## iter 50 value 7.429221  
## iter 60 value 7.429044  
## final value 7.429042   
## converged  
## # weights: 91  
## initial value 110.700635   
## iter 10 value 16.699966  
## iter 20 value 3.861596  
## iter 30 value 3.142170  
## iter 40 value 3.139539  
## final value 3.139491   
## converged  
## # weights: 109  
## initial value 121.872265   
## iter 10 value 12.658274  
## iter 20 value 4.690939  
## iter 30 value 3.864849  
## iter 40 value 2.551372  
## iter 50 value 2.527249  
## iter 60 value 2.512392  
## iter 70 value 2.507319  
## iter 80 value 2.506602  
## iter 90 value 2.506046  
## iter 100 value 2.504398  
## final value 2.504398   
## stopped after 100 iterations  
## # weights: 127  
## initial value 120.384520   
## iter 10 value 12.982356  
## iter 20 value 0.305360  
## iter 30 value 0.002570  
## iter 40 value 0.000189  
## iter 50 value 0.000118  
## final value 0.000095   
## converged  
## # weights: 145  
## initial value 99.675459   
## iter 10 value 13.840398  
## iter 20 value 1.692833  
## iter 30 value 1.390791  
## iter 40 value 1.386577  
## iter 50 value 1.386342  
## iter 60 value 1.386324  
## final value 1.386295   
## converged  
## # weights: 163  
## initial value 143.192039   
## iter 10 value 16.864766  
## iter 20 value 1.228502  
## iter 30 value 0.021092  
## iter 40 value 0.001046  
## final value 0.000058   
## converged  
## # weights: 181  
## initial value 117.189385   
## iter 10 value 10.523140  
## iter 20 value 0.504713  
## iter 30 value 0.011922  
## iter 40 value 0.000499  
## iter 50 value 0.000122  
## final value 0.000094   
## converged  
## # weights: 199  
## initial value 110.986853   
## iter 10 value 12.121503  
## iter 20 value 3.589328  
## iter 30 value 0.429413  
## iter 40 value 0.062015  
## iter 50 value 0.015584  
## iter 60 value 0.007171  
## iter 70 value 0.002527  
## iter 80 value 0.000422  
## iter 90 value 0.000364  
## iter 100 value 0.000281  
## final value 0.000281   
## stopped after 100 iterations  
## # weights: 217  
## initial value 136.684089   
## iter 10 value 8.232495  
## iter 20 value 0.179560  
## iter 30 value 0.004042  
## final value 0.000098   
## converged  
## # weights: 235  
## initial value 128.246185   
## iter 10 value 9.747716  
## iter 20 value 1.023137  
## iter 30 value 0.008616  
## iter 40 value 0.001932  
## iter 50 value 0.000105  
## iter 50 value 0.000065  
## iter 50 value 0.000064  
## final value 0.000064   
## converged  
## # weights: 253  
## initial value 124.573818   
## iter 10 value 16.048659  
## iter 20 value 0.475867  
## iter 30 value 0.004891  
## final value 0.000095   
## converged  
## # weights: 271  
## initial value 143.764250   
## iter 10 value 10.318522  
## iter 20 value 0.228972  
## iter 30 value 0.004393  
## iter 40 value 0.001104  
## iter 50 value 0.000254  
## final value 0.000097   
## converged  
## # weights: 289  
## initial value 129.911118   
## iter 10 value 16.263305  
## iter 20 value 1.037213  
## iter 30 value 0.014053  
## iter 40 value 0.000383  
## final value 0.000095   
## converged  
## # weights: 307  
## initial value 128.109247   
## iter 10 value 11.063694  
## iter 20 value 0.257598  
## iter 30 value 0.008653  
## iter 40 value 0.000592  
## final value 0.000096   
## converged  
## # weights: 325  
## initial value 85.228834   
## iter 10 value 12.563799  
## iter 20 value 0.447697  
## iter 30 value 0.010466  
## iter 40 value 0.000376  
## iter 50 value 0.000255  
## final value 0.000057   
## converged  
## # weights: 343  
## initial value 109.727234   
## iter 10 value 12.356166  
## iter 20 value 0.479398  
## iter 30 value 0.013768  
## iter 40 value 0.002067  
## iter 50 value 0.000117  
## iter 50 value 0.000073  
## iter 50 value 0.000072  
## final value 0.000072   
## converged  
## # weights: 361  
## initial value 148.233606   
## iter 10 value 9.506310  
## iter 20 value 0.938320  
## iter 30 value 0.013812  
## iter 40 value 0.000939  
## iter 50 value 0.000158  
## final value 0.000065   
## converged  
## # weights: 19  
## initial value 113.662340   
## iter 10 value 40.030526  
## iter 20 value 25.717747  
## iter 30 value 25.050823  
## final value 25.050700   
## converged  
## # weights: 37  
## initial value 118.372530   
## iter 10 value 42.899268  
## iter 20 value 22.786510  
## iter 30 value 19.785874  
## iter 40 value 17.122184  
## iter 50 value 16.972684  
## iter 60 value 16.938259  
## iter 70 value 16.874679  
## iter 80 value 16.845548  
## final value 16.845543   
## converged  
## # weights: 55  
## initial value 110.646583   
## iter 10 value 24.206446  
## iter 20 value 17.421816  
## iter 30 value 15.165780  
## iter 40 value 14.286043  
## iter 50 value 14.191763  
## iter 60 value 14.191169  
## final value 14.191166   
## converged  
## # weights: 73  
## initial value 115.137257   
## iter 10 value 26.490464  
## iter 20 value 19.170779  
## iter 30 value 16.520671  
## iter 40 value 15.692828  
## iter 50 value 15.125376  
## iter 60 value 14.356648  
## iter 70 value 13.978190  
## iter 80 value 13.969232  
## iter 90 value 13.968999  
## final value 13.968995   
## converged  
## # weights: 91  
## initial value 121.880434   
## iter 10 value 37.454240  
## iter 20 value 17.763527  
## iter 30 value 15.227946  
## iter 40 value 14.336459  
## iter 50 value 13.788468  
## iter 60 value 13.594263  
## iter 70 value 13.554384  
## iter 80 value 13.537611  
## iter 90 value 13.532343  
## iter 100 value 13.528981  
## final value 13.528981   
## stopped after 100 iterations  
## # weights: 109  
## initial value 115.075929   
## iter 10 value 21.789029  
## iter 20 value 14.888881  
## iter 30 value 13.627875  
## iter 40 value 13.246110  
## iter 50 value 13.116473  
## iter 60 value 13.098863  
## iter 70 value 13.095315  
## iter 80 value 13.095086  
## iter 90 value 13.095011  
## final value 13.095011   
## converged  
## # weights: 127  
## initial value 116.301302   
## iter 10 value 19.331383  
## iter 20 value 15.561788  
## iter 30 value 13.785453  
## iter 40 value 12.929928  
## iter 50 value 12.766977  
## iter 60 value 12.732111  
## iter 70 value 12.713186  
## iter 80 value 12.712833  
## iter 90 value 12.712720  
## final value 12.712707   
## converged  
## # weights: 145  
## initial value 155.050611   
## iter 10 value 18.203059  
## iter 20 value 14.252613  
## iter 30 value 13.323408  
## iter 40 value 12.952702  
## iter 50 value 12.816840  
## iter 60 value 12.771957  
## iter 70 value 12.715398  
## iter 80 value 12.645934  
## iter 90 value 12.630006  
## iter 100 value 12.587718  
## final value 12.587718   
## stopped after 100 iterations  
## # weights: 163  
## initial value 155.649771   
## iter 10 value 25.465486  
## iter 20 value 14.680777  
## iter 30 value 13.470864  
## iter 40 value 13.010232  
## iter 50 value 12.842316  
## iter 60 value 12.780782  
## iter 70 value 12.607305  
## iter 80 value 12.538301  
## iter 90 value 12.515506  
## iter 100 value 12.496660  
## final value 12.496660   
## stopped after 100 iterations  
## # weights: 181  
## initial value 112.328761   
## iter 10 value 24.315740  
## iter 20 value 14.954037  
## iter 30 value 13.272592  
## iter 40 value 12.566647  
## iter 50 value 12.471961  
## iter 60 value 12.455608  
## iter 70 value 12.442195  
## iter 80 value 12.432549  
## iter 90 value 12.430025  
## iter 100 value 12.428826  
## final value 12.428826   
## stopped after 100 iterations  
## # weights: 199  
## initial value 163.800128   
## iter 10 value 22.186473  
## iter 20 value 14.762837  
## iter 30 value 13.598319  
## iter 40 value 13.093062  
## iter 50 value 12.893092  
## iter 60 value 12.797137  
## iter 70 value 12.771890  
## iter 80 value 12.656882  
## iter 90 value 12.583102  
## iter 100 value 12.520301  
## final value 12.520301   
## stopped after 100 iterations  
## # weights: 217  
## initial value 110.487325   
## iter 10 value 18.170094  
## iter 20 value 13.542409  
## iter 30 value 12.923335  
## iter 40 value 12.698357  
## iter 50 value 12.614846  
## iter 60 value 12.586285  
## iter 70 value 12.578562  
## iter 80 value 12.576639  
## iter 90 value 12.575812  
## iter 100 value 12.575658  
## final value 12.575658   
## stopped after 100 iterations  
## # weights: 235  
## initial value 135.265505   
## iter 10 value 21.146886  
## iter 20 value 14.977379  
## iter 30 value 13.169237  
## iter 40 value 12.814115  
## iter 50 value 12.585907  
## iter 60 value 12.510050  
## iter 70 value 12.476185  
## iter 80 value 12.463286  
## iter 90 value 12.436047  
## iter 100 value 12.407018  
## final value 12.407018   
## stopped after 100 iterations  
## # weights: 253  
## initial value 152.656087   
## iter 10 value 20.591191  
## iter 20 value 14.441126  
## iter 30 value 12.874978  
## iter 40 value 12.628603  
## iter 50 value 12.525929  
## iter 60 value 12.482903  
## iter 70 value 12.425795  
## iter 80 value 12.407870  
## iter 90 value 12.398250  
## iter 100 value 12.389877  
## final value 12.389877   
## stopped after 100 iterations  
## # weights: 271  
## initial value 149.637202   
## iter 10 value 23.130588  
## iter 20 value 15.898915  
## iter 30 value 13.259740  
## iter 40 value 12.791796  
## iter 50 value 12.699312  
## iter 60 value 12.669558  
## iter 70 value 12.643453  
## iter 80 value 12.626782  
## iter 90 value 12.623849  
## iter 100 value 12.621799  
## final value 12.621799   
## stopped after 100 iterations  
## # weights: 289  
## initial value 123.250214   
## iter 10 value 17.034512  
## iter 20 value 13.595062  
## iter 30 value 12.756065  
## iter 40 value 12.545681  
## iter 50 value 12.461187  
## iter 60 value 12.428104  
## iter 70 value 12.418447  
## iter 80 value 12.406238  
## iter 90 value 12.399195  
## iter 100 value 12.393192  
## final value 12.393192   
## stopped after 100 iterations  
## # weights: 307  
## initial value 217.972719   
## iter 10 value 21.990151  
## iter 20 value 14.574109  
## iter 30 value 13.024301  
## iter 40 value 12.717951  
## iter 50 value 12.653262  
## iter 60 value 12.625740  
## iter 70 value 12.614232  
## iter 80 value 12.600569  
## iter 90 value 12.599297  
## iter 100 value 12.598724  
## final value 12.598724   
## stopped after 100 iterations  
## # weights: 325  
## initial value 152.470897   
## iter 10 value 19.761351  
## iter 20 value 13.772386  
## iter 30 value 12.711767  
## iter 40 value 12.448351  
## iter 50 value 12.400203  
## iter 60 value 12.387403  
## iter 70 value 12.382234  
## iter 80 value 12.380986  
## iter 90 value 12.380431  
## iter 100 value 12.379608  
## final value 12.379608   
## stopped after 100 iterations  
## # weights: 343  
## initial value 175.750990   
## iter 10 value 20.519194  
## iter 20 value 14.904011  
## iter 30 value 13.378381  
## iter 40 value 12.857584  
## iter 50 value 12.707509  
## iter 60 value 12.556373  
## iter 70 value 12.419083  
## iter 80 value 12.388728  
## iter 90 value 12.374848  
## iter 100 value 12.371422  
## final value 12.371422   
## stopped after 100 iterations  
## # weights: 361  
## initial value 116.146562   
## iter 10 value 18.495601  
## iter 20 value 13.492274  
## iter 30 value 12.653302  
## iter 40 value 12.480100  
## iter 50 value 12.430187  
## iter 60 value 12.412139  
## iter 70 value 12.404710  
## iter 80 value 12.397792  
## iter 90 value 12.394752  
## iter 100 value 12.393805  
## final value 12.393805   
## stopped after 100 iterations  
## # weights: 19  
## initial value 119.980941   
## iter 10 value 30.909558  
## iter 20 value 29.100578  
## iter 30 value 29.027353  
## final value 29.027344   
## converged  
## # weights: 37  
## initial value 138.826935   
## iter 10 value 38.416906  
## iter 20 value 30.974153  
## iter 30 value 26.527730  
## iter 40 value 23.770693  
## iter 50 value 23.281512  
## iter 60 value 23.125478  
## iter 70 value 23.057519  
## iter 80 value 22.946190  
## iter 90 value 22.932589  
## final value 22.932403   
## converged  
## # weights: 55  
## initial value 127.510487   
## iter 10 value 29.607386  
## iter 20 value 22.218829  
## iter 30 value 20.836256  
## iter 40 value 20.598317  
## final value 20.596591   
## converged  
## # weights: 73  
## initial value 118.155625   
## iter 10 value 27.215454  
## iter 20 value 21.785512  
## iter 30 value 21.180323  
## iter 40 value 21.071817  
## iter 50 value 21.063407  
## final value 21.063376   
## converged  
## # weights: 91  
## initial value 111.533108   
## iter 10 value 23.836378  
## iter 20 value 21.062770  
## iter 30 value 19.674899  
## iter 40 value 19.594414  
## iter 50 value 19.573388  
## final value 19.573155   
## converged  
## # weights: 109  
## initial value 135.529124   
## iter 10 value 54.778742  
## iter 20 value 22.505977  
## iter 30 value 20.397576  
## iter 40 value 19.950660  
## iter 50 value 19.732374  
## iter 60 value 19.612474  
## iter 70 value 19.468265  
## iter 80 value 19.377610  
## iter 90 value 19.355162  
## iter 100 value 19.353074  
## final value 19.353074   
## stopped after 100 iterations  
## # weights: 127  
## initial value 143.145062   
## iter 10 value 28.030701  
## iter 20 value 21.515349  
## iter 30 value 20.149543  
## iter 40 value 19.525843  
## iter 50 value 19.318692  
## iter 60 value 19.268282  
## iter 70 value 19.266494  
## iter 80 value 19.266107  
## iter 90 value 19.265759  
## iter 100 value 19.265582  
## final value 19.265582   
## stopped after 100 iterations  
## # weights: 145  
## initial value 129.682948   
## iter 10 value 30.222737  
## iter 20 value 22.835758  
## iter 30 value 20.087667  
## iter 40 value 19.340300  
## iter 50 value 19.236126  
## iter 60 value 19.204284  
## iter 70 value 19.186835  
## iter 80 value 19.177779  
## iter 90 value 19.119066  
## iter 100 value 19.111197  
## final value 19.111197   
## stopped after 100 iterations  
## # weights: 163  
## initial value 140.167072   
## iter 10 value 28.235750  
## iter 20 value 21.205975  
## iter 30 value 19.757680  
## iter 40 value 19.333543  
## iter 50 value 19.250246  
## iter 60 value 19.202488  
## iter 70 value 19.109971  
## iter 80 value 19.088123  
## iter 90 value 19.087309  
## iter 100 value 19.087278  
## final value 19.087278   
## stopped after 100 iterations  
## # weights: 181  
## initial value 132.060583   
## iter 10 value 36.096881  
## iter 20 value 21.128388  
## iter 30 value 19.791341  
## iter 40 value 19.401455  
## iter 50 value 19.147998  
## iter 60 value 19.078988  
## iter 70 value 19.064176  
## iter 80 value 19.061186  
## iter 90 value 19.060742  
## iter 100 value 19.060720  
## final value 19.060720   
## stopped after 100 iterations  
## # weights: 199  
## initial value 130.074954   
## iter 10 value 25.566124  
## iter 20 value 20.369013  
## iter 30 value 19.598562  
## iter 40 value 19.462390  
## iter 50 value 19.193375  
## iter 60 value 19.107926  
## iter 70 value 19.075220  
## iter 80 value 19.062111  
## iter 90 value 19.057969  
## iter 100 value 19.057597  
## final value 19.057597   
## stopped after 100 iterations  
## # weights: 217  
## initial value 129.482818   
## iter 10 value 25.032900  
## iter 20 value 20.688675  
## iter 30 value 19.876986  
## iter 40 value 19.535096  
## iter 50 value 19.236453  
## iter 60 value 19.096907  
## iter 70 value 19.071079  
## iter 80 value 19.067100  
## iter 90 value 19.051585  
## iter 100 value 19.048567  
## final value 19.048567   
## stopped after 100 iterations  
## # weights: 235  
## initial value 115.539810   
## iter 10 value 25.102283  
## iter 20 value 20.247133  
## iter 30 value 19.393910  
## iter 40 value 19.209342  
## iter 50 value 19.164946  
## iter 60 value 19.139851  
## iter 70 value 19.135769  
## iter 80 value 19.115954  
## iter 90 value 19.023426  
## iter 100 value 19.019907  
## final value 19.019907   
## stopped after 100 iterations  
## # weights: 253  
## initial value 174.091541   
## iter 10 value 26.886978  
## iter 20 value 20.087792  
## iter 30 value 19.529210  
## iter 40 value 19.099463  
## iter 50 value 19.039475  
## iter 60 value 19.009128  
## iter 70 value 19.004070  
## iter 80 value 19.000778  
## iter 90 value 18.998690  
## iter 100 value 18.998466  
## final value 18.998466   
## stopped after 100 iterations  
## # weights: 271  
## initial value 132.408213   
## iter 10 value 23.958293  
## iter 20 value 20.137542  
## iter 30 value 19.356199  
## iter 40 value 19.231220  
## iter 50 value 19.199201  
## iter 60 value 19.046159  
## iter 70 value 19.011988  
## iter 80 value 19.003508  
## iter 90 value 18.998448  
## iter 100 value 18.995270  
## final value 18.995270   
## stopped after 100 iterations  
## # weights: 289  
## initial value 119.811928   
## iter 10 value 24.778487  
## iter 20 value 20.034154  
## iter 30 value 19.234523  
## iter 40 value 19.098503  
## iter 50 value 19.056161  
## iter 60 value 19.030614  
## iter 70 value 19.012241  
## iter 80 value 18.998974  
## iter 90 value 18.995918  
## iter 100 value 18.993981  
## final value 18.993981   
## stopped after 100 iterations  
## # weights: 307  
## initial value 161.353352   
## iter 10 value 26.469254  
## iter 20 value 20.581436  
## iter 30 value 19.583647  
## iter 40 value 19.368354  
## iter 50 value 19.142469  
## iter 60 value 19.061866  
## iter 70 value 19.033248  
## iter 80 value 19.026618  
## iter 90 value 19.025541  
## iter 100 value 19.025294  
## final value 19.025294   
## stopped after 100 iterations  
## # weights: 325  
## initial value 170.527009   
## iter 10 value 26.918037  
## iter 20 value 20.955706  
## iter 30 value 19.938406  
## iter 40 value 19.512523  
## iter 50 value 19.243485  
## iter 60 value 19.148093  
## iter 70 value 19.090403  
## iter 80 value 19.033759  
## iter 90 value 19.026115  
## iter 100 value 19.023984  
## final value 19.023984   
## stopped after 100 iterations  
## # weights: 343  
## initial value 134.048595   
## iter 10 value 25.300766  
## iter 20 value 20.022261  
## iter 30 value 19.361064  
## iter 40 value 19.122459  
## iter 50 value 19.069238  
## iter 60 value 19.056335  
## iter 70 value 19.048684  
## iter 80 value 19.045347  
## iter 90 value 19.044763  
## iter 100 value 19.044548  
## final value 19.044548   
## stopped after 100 iterations  
## # weights: 361  
## initial value 145.201906   
## iter 10 value 31.019441  
## iter 20 value 20.769181  
## iter 30 value 19.398016  
## iter 40 value 19.232965  
## iter 50 value 19.164730  
## iter 60 value 19.066820  
## iter 70 value 19.004498  
## iter 80 value 18.991698  
## iter 90 value 18.989871  
## iter 100 value 18.989645  
## final value 18.989645   
## stopped after 100 iterations  
## # weights: 19  
## initial value 124.389435   
## iter 10 value 27.447802  
## iter 20 value 10.649118  
## iter 30 value 9.489136  
## iter 40 value 9.475399  
## iter 50 value 9.475294  
## final value 9.475292   
## converged  
## # weights: 37  
## initial value 126.783918   
## iter 10 value 16.182403  
## iter 20 value 6.980505  
## iter 30 value 3.076557  
## iter 40 value 2.794811  
## iter 50 value 2.775484  
## iter 60 value 2.772954  
## iter 70 value 2.772697  
## iter 80 value 2.772645  
## final value 2.772622   
## converged  
## # weights: 55  
## initial value 129.464479   
## iter 10 value 32.416050  
## iter 20 value 10.073119  
## iter 30 value 4.456032  
## iter 40 value 2.963217  
## iter 50 value 2.598783  
## iter 60 value 1.937144  
## iter 70 value 1.920659  
## iter 80 value 1.917182  
## iter 90 value 1.913915  
## iter 100 value 1.912175  
## final value 1.912175   
## stopped after 100 iterations  
## # weights: 73  
## initial value 110.682397   
## iter 10 value 17.152595  
## iter 20 value 4.256409  
## iter 30 value 1.469814  
## iter 40 value 1.388280  
## iter 50 value 1.386573  
## iter 60 value 1.386360  
## iter 70 value 1.386297  
## final value 1.386294   
## converged  
## # weights: 91  
## initial value 116.300733   
## iter 10 value 12.555354  
## iter 20 value 0.801752  
## iter 30 value 0.012666  
## iter 40 value 0.000604  
## iter 50 value 0.000224  
## final value 0.000077   
## converged  
## # weights: 109  
## initial value 117.052642   
## iter 10 value 10.137013  
## iter 20 value 2.003063  
## iter 30 value 1.911565  
## iter 40 value 1.909248  
## iter 50 value 1.388926  
## iter 60 value 1.386397  
## iter 70 value 1.386352  
## iter 80 value 1.386331  
## final value 1.386331   
## converged  
## # weights: 127  
## initial value 113.962050   
## iter 10 value 13.429784  
## iter 20 value 0.636651  
## iter 30 value 0.005624  
## iter 40 value 0.000625  
## final value 0.000071   
## converged  
## # weights: 145  
## initial value 198.614246   
## iter 10 value 10.895299  
## iter 20 value 0.213567  
## iter 30 value 0.002233  
## final value 0.000056   
## converged  
## # weights: 163  
## initial value 154.461938   
## iter 10 value 8.397527  
## iter 20 value 0.115260  
## iter 30 value 0.001562  
## iter 40 value 0.000111  
## iter 40 value 0.000081  
## iter 40 value 0.000080  
## final value 0.000080   
## converged  
## # weights: 181  
## initial value 153.000400   
## iter 10 value 13.315680  
## iter 20 value 1.170009  
## iter 30 value 0.021624  
## iter 40 value 0.000764  
## iter 50 value 0.000205  
## final value 0.000097   
## converged  
## # weights: 199  
## initial value 100.414397   
## iter 10 value 12.448549  
## iter 20 value 0.188990  
## iter 30 value 0.004573  
## iter 40 value 0.000247  
## final value 0.000096   
## converged  
## # weights: 217  
## initial value 132.096812   
## iter 10 value 16.178167  
## iter 20 value 0.227064  
## iter 30 value 0.006571  
## iter 40 value 0.001317  
## final value 0.000096   
## converged  
## # weights: 235  
## initial value 104.119239   
## iter 10 value 13.341583  
## iter 20 value 0.310885  
## iter 30 value 0.004926  
## iter 40 value 0.000347  
## final value 0.000097   
## converged  
## # weights: 253  
## initial value 123.399612   
## iter 10 value 11.846045  
## iter 20 value 0.226433  
## iter 30 value 0.001173  
## final value 0.000089   
## converged  
## # weights: 271  
## initial value 133.903318   
## iter 10 value 10.536262  
## iter 20 value 0.212413  
## iter 30 value 0.007955  
## iter 40 value 0.000690  
## final value 0.000092   
## converged  
## # weights: 289  
## initial value 124.386154   
## iter 10 value 7.482266  
## iter 20 value 0.093071  
## iter 30 value 0.002184  
## iter 40 value 0.000379  
## final value 0.000090   
## converged  
## # weights: 307  
## initial value 126.205068   
## iter 10 value 8.369598  
## iter 20 value 0.221866  
## iter 30 value 0.006758  
## iter 40 value 0.000837  
## iter 50 value 0.000116  
## iter 50 value 0.000091  
## iter 50 value 0.000091  
## final value 0.000091   
## converged  
## # weights: 325  
## initial value 123.142873   
## iter 10 value 6.710015  
## iter 20 value 0.133390  
## iter 30 value 0.006466  
## iter 40 value 0.001637  
## iter 50 value 0.000234  
## iter 60 value 0.000182  
## final value 0.000068   
## converged  
## # weights: 343  
## initial value 151.926837   
## iter 10 value 7.148661  
## iter 20 value 0.089515  
## iter 30 value 0.003863  
## iter 40 value 0.000368  
## final value 0.000079   
## converged  
## # weights: 361  
## initial value 273.259291   
## iter 10 value 10.336384  
## iter 20 value 0.208544  
## iter 30 value 0.005783  
## iter 40 value 0.000549  
## final value 0.000077   
## converged  
## # weights: 19  
## initial value 115.578190   
## iter 10 value 51.014768  
## iter 20 value 23.357421  
## iter 30 value 20.603676  
## iter 40 value 20.587664  
## final value 20.587664   
## converged  
## # weights: 37  
## initial value 124.889694   
## iter 10 value 38.089963  
## iter 20 value 20.468422  
## iter 30 value 17.836611  
## iter 40 value 15.874961  
## iter 50 value 14.975176  
## iter 60 value 14.879186  
## iter 70 value 14.630108  
## iter 80 value 14.608209  
## final value 14.608165   
## converged  
## # weights: 55  
## initial value 131.000216   
## iter 10 value 21.826240  
## iter 20 value 17.135129  
## iter 30 value 15.159402  
## iter 40 value 14.173353  
## iter 50 value 13.755763  
## iter 60 value 13.690312  
## iter 70 value 13.579407  
## iter 80 value 13.501550  
## iter 90 value 13.494902  
## final value 13.494892   
## converged  
## # weights: 73  
## initial value 124.652288   
## iter 10 value 34.801633  
## iter 20 value 22.713963  
## iter 30 value 16.256507  
## iter 40 value 14.482497  
## iter 50 value 13.723126  
## iter 60 value 13.362945  
## iter 70 value 13.314335  
## iter 80 value 13.220683  
## iter 90 value 13.139576  
## iter 100 value 12.998458  
## final value 12.998458   
## stopped after 100 iterations  
## # weights: 91  
## initial value 114.650947   
## iter 10 value 25.985646  
## iter 20 value 15.303154  
## iter 30 value 12.982333  
## iter 40 value 12.721513  
## iter 50 value 12.715772  
## iter 60 value 12.714342  
## iter 70 value 12.714185  
## iter 70 value 12.714185  
## iter 70 value 12.714185  
## final value 12.714185   
## converged  
## # weights: 109  
## initial value 140.408887   
## iter 10 value 17.511773  
## iter 20 value 12.916313  
## iter 30 value 12.212784  
## iter 40 value 12.005573  
## iter 50 value 11.961369  
## iter 60 value 11.944151  
## iter 70 value 11.923529  
## iter 80 value 11.918525  
## iter 90 value 11.918436  
## final value 11.918434   
## converged  
## # weights: 127  
## initial value 116.061935   
## iter 10 value 26.947156  
## iter 20 value 15.447751  
## iter 30 value 12.777414  
## iter 40 value 12.151877  
## iter 50 value 11.875668  
## iter 60 value 11.741953  
## iter 70 value 11.661560  
## iter 80 value 11.609412  
## iter 90 value 11.565679  
## iter 100 value 11.562407  
## final value 11.562407   
## stopped after 100 iterations  
## # weights: 145  
## initial value 140.480102   
## iter 10 value 16.316129  
## iter 20 value 12.734952  
## iter 30 value 12.035925  
## iter 40 value 11.865205  
## iter 50 value 11.828819  
## iter 60 value 11.814851  
## iter 70 value 11.762613  
## iter 80 value 11.750996  
## iter 90 value 11.691138  
## iter 100 value 11.678683  
## final value 11.678683   
## stopped after 100 iterations  
## # weights: 163  
## initial value 130.961235   
## iter 10 value 36.182434  
## iter 20 value 14.505022  
## iter 30 value 12.307422  
## iter 40 value 11.990003  
## iter 50 value 11.758384  
## iter 60 value 11.672357  
## iter 70 value 11.660093  
## iter 80 value 11.654383  
## iter 90 value 11.652837  
## iter 100 value 11.652268  
## final value 11.652268   
## stopped after 100 iterations  
## # weights: 181  
## initial value 123.415280   
## iter 10 value 18.361637  
## iter 20 value 12.965966  
## iter 30 value 11.954707  
## iter 40 value 11.772611  
## iter 50 value 11.685285  
## iter 60 value 11.663565  
## iter 70 value 11.653681  
## iter 80 value 11.636511  
## iter 90 value 11.619084  
## iter 100 value 11.614990  
## final value 11.614990   
## stopped after 100 iterations  
## # weights: 199  
## initial value 135.313249   
## iter 10 value 22.303106  
## iter 20 value 14.295357  
## iter 30 value 12.216659  
## iter 40 value 11.845220  
## iter 50 value 11.631914  
## iter 60 value 11.516991  
## iter 70 value 11.468958  
## iter 80 value 11.449477  
## iter 90 value 11.445633  
## iter 100 value 11.445334  
## final value 11.445334   
## stopped after 100 iterations  
## # weights: 217  
## initial value 138.051646   
## iter 10 value 21.482728  
## iter 20 value 14.485969  
## iter 30 value 12.416625  
## iter 40 value 11.731488  
## iter 50 value 11.612645  
## iter 60 value 11.580736  
## iter 70 value 11.558364  
## iter 80 value 11.531882  
## iter 90 value 11.515387  
## iter 100 value 11.497646  
## final value 11.497646   
## stopped after 100 iterations  
## # weights: 235  
## initial value 131.521223   
## iter 10 value 18.131359  
## iter 20 value 13.291779  
## iter 30 value 12.063614  
## iter 40 value 11.752378  
## iter 50 value 11.670849  
## iter 60 value 11.548864  
## iter 70 value 11.474669  
## iter 80 value 11.435932  
## iter 90 value 11.423039  
## iter 100 value 11.415229  
## final value 11.415229   
## stopped after 100 iterations  
## # weights: 253  
## initial value 139.868306   
## iter 10 value 21.820787  
## iter 20 value 13.671493  
## iter 30 value 12.315827  
## iter 40 value 11.790944  
## iter 50 value 11.602428  
## iter 60 value 11.534275  
## iter 70 value 11.526363  
## iter 80 value 11.517470  
## iter 90 value 11.509719  
## iter 100 value 11.506733  
## final value 11.506733   
## stopped after 100 iterations  
## # weights: 271  
## initial value 147.117318   
## iter 10 value 19.788957  
## iter 20 value 13.163802  
## iter 30 value 11.886384  
## iter 40 value 11.603801  
## iter 50 value 11.462698  
## iter 60 value 11.435701  
## iter 70 value 11.418702  
## iter 80 value 11.413862  
## iter 90 value 11.408568  
## iter 100 value 11.403329  
## final value 11.403329   
## stopped after 100 iterations  
## # weights: 289  
## initial value 133.286848   
## iter 10 value 24.658539  
## iter 20 value 13.882015  
## iter 30 value 12.181150  
## iter 40 value 11.764433  
## iter 50 value 11.551367  
## iter 60 value 11.458480  
## iter 70 value 11.430224  
## iter 80 value 11.397002  
## iter 90 value 11.388676  
## iter 100 value 11.385967  
## final value 11.385967   
## stopped after 100 iterations  
## # weights: 307  
## initial value 141.580797   
## iter 10 value 31.866020  
## iter 20 value 16.501028  
## iter 30 value 12.719703  
## iter 40 value 11.900184  
## iter 50 value 11.594817  
## iter 60 value 11.490141  
## iter 70 value 11.471774  
## iter 80 value 11.456820  
## iter 90 value 11.438625  
## iter 100 value 11.435750  
## final value 11.435750   
## stopped after 100 iterations  
## # weights: 325  
## initial value 323.455179   
## iter 10 value 18.569843  
## iter 20 value 12.686428  
## iter 30 value 11.819838  
## iter 40 value 11.658253  
## iter 50 value 11.593652  
## iter 60 value 11.579964  
## iter 70 value 11.559342  
## iter 80 value 11.512871  
## iter 90 value 11.466474  
## iter 100 value 11.446935  
## final value 11.446935   
## stopped after 100 iterations  
## # weights: 343  
## initial value 129.240670   
## iter 10 value 18.775125  
## iter 20 value 13.164630  
## iter 30 value 11.732679  
## iter 40 value 11.602446  
## iter 50 value 11.561993  
## iter 60 value 11.550361  
## iter 70 value 11.546012  
## iter 80 value 11.538909  
## iter 90 value 11.536987  
## iter 100 value 11.536149  
## final value 11.536149   
## stopped after 100 iterations  
## # weights: 361  
## initial value 141.340814   
## iter 10 value 17.665243  
## iter 20 value 12.473962  
## iter 30 value 11.740023  
## iter 40 value 11.536377  
## iter 50 value 11.419241  
## iter 60 value 11.383046  
## iter 70 value 11.372761  
## iter 80 value 11.355750  
## iter 90 value 11.341161  
## iter 100 value 11.335916  
## final value 11.335916   
## stopped after 100 iterations  
## # weights: 19  
## initial value 118.190581   
## iter 10 value 63.943686  
## iter 20 value 28.297471  
## iter 30 value 26.538636  
## final value 26.537323   
## converged  
## # weights: 37  
## initial value 122.364154   
## iter 10 value 38.121506  
## iter 20 value 24.815077  
## iter 30 value 22.711647  
## iter 40 value 21.115438  
## iter 50 value 20.873750  
## final value 20.873579   
## converged  
## # weights: 55  
## initial value 137.481061   
## iter 10 value 36.859596  
## iter 20 value 23.277838  
## iter 30 value 21.023123  
## iter 40 value 20.388538  
## iter 50 value 20.135634  
## iter 60 value 20.091926  
## iter 70 value 20.089561  
## final value 20.089538   
## converged  
## # weights: 73  
## initial value 123.971082   
## iter 10 value 30.502209  
## iter 20 value 21.703954  
## iter 30 value 19.781342  
## iter 40 value 19.298322  
## iter 50 value 19.210085  
## iter 60 value 19.183127  
## iter 70 value 19.173855  
## iter 80 value 19.173704  
## final value 19.173704   
## converged  
## # weights: 91  
## initial value 113.596418   
## iter 10 value 29.796219  
## iter 20 value 21.471195  
## iter 30 value 20.057046  
## iter 40 value 19.356238  
## iter 50 value 19.028062  
## iter 60 value 18.467080  
## iter 70 value 18.392086  
## iter 80 value 18.389018  
## final value 18.389010   
## converged  
## # weights: 109  
## initial value 122.597666   
## iter 10 value 24.173818  
## iter 20 value 19.218303  
## iter 30 value 18.608391  
## iter 40 value 18.556475  
## iter 50 value 18.552453  
## iter 60 value 18.552152  
## iter 70 value 18.548368  
## iter 80 value 18.546876  
## final value 18.546871   
## converged  
## # weights: 127  
## initial value 112.399362   
## iter 10 value 23.255617  
## iter 20 value 19.804515  
## iter 30 value 18.687989  
## iter 40 value 18.332919  
## iter 50 value 18.240624  
## iter 60 value 18.231873  
## iter 70 value 18.230175  
## iter 80 value 18.230112  
## final value 18.230111   
## converged  
## # weights: 145  
## initial value 107.796870   
## iter 10 value 32.661360  
## iter 20 value 19.937998  
## iter 30 value 18.716647  
## iter 40 value 18.405189  
## iter 50 value 18.272264  
## iter 60 value 18.246486  
## iter 70 value 18.245394  
## iter 80 value 18.245249  
## iter 90 value 18.245201  
## final value 18.245200   
## converged  
## # weights: 163  
## initial value 114.481978   
## iter 10 value 23.901050  
## iter 20 value 19.536202  
## iter 30 value 18.559334  
## iter 40 value 18.328966  
## iter 50 value 18.227693  
## iter 60 value 18.176905  
## iter 70 value 18.148970  
## iter 80 value 18.142068  
## iter 90 value 18.138677  
## iter 100 value 18.129484  
## final value 18.129484   
## stopped after 100 iterations  
## # weights: 181  
## initial value 128.946607   
## iter 10 value 27.789000  
## iter 20 value 19.640781  
## iter 30 value 18.702974  
## iter 40 value 18.462153  
## iter 50 value 18.387064  
## iter 60 value 18.287225  
## iter 70 value 18.147574  
## iter 80 value 18.054868  
## iter 90 value 18.035762  
## iter 100 value 18.031507  
## final value 18.031507   
## stopped after 100 iterations  
## # weights: 199  
## initial value 143.296700   
## iter 10 value 22.709103  
## iter 20 value 18.823058  
## iter 30 value 18.366709  
## iter 40 value 18.206974  
## iter 50 value 18.142907  
## iter 60 value 18.100376  
## iter 70 value 18.096904  
## iter 80 value 18.096772  
## final value 18.096767   
## converged  
## # weights: 217  
## initial value 124.384971   
## iter 10 value 25.707973  
## iter 20 value 19.412644  
## iter 30 value 18.398362  
## iter 40 value 18.126943  
## iter 50 value 18.018867  
## iter 60 value 17.979912  
## iter 70 value 17.958496  
## iter 80 value 17.947368  
## iter 90 value 17.947031  
## iter 100 value 17.946975  
## final value 17.946975   
## stopped after 100 iterations  
## # weights: 235  
## initial value 143.551538   
## iter 10 value 24.147950  
## iter 20 value 19.032097  
## iter 30 value 18.563848  
## iter 40 value 18.192210  
## iter 50 value 18.103725  
## iter 60 value 18.063856  
## iter 70 value 18.052869  
## iter 80 value 18.050852  
## iter 90 value 18.050591  
## iter 100 value 18.050482  
## final value 18.050482   
## stopped after 100 iterations  
## # weights: 253  
## initial value 132.100534   
## iter 10 value 24.169810  
## iter 20 value 19.291870  
## iter 30 value 18.560785  
## iter 40 value 18.393038  
## iter 50 value 18.332613  
## iter 60 value 18.307360  
## iter 70 value 18.288415  
## iter 80 value 18.268101  
## iter 90 value 18.260529  
## iter 100 value 18.257085  
## final value 18.257085   
## stopped after 100 iterations  
## # weights: 271  
## initial value 136.060837   
## iter 10 value 31.076460  
## iter 20 value 21.024688  
## iter 30 value 18.422724  
## iter 40 value 18.162605  
## iter 50 value 18.089068  
## iter 60 value 18.056058  
## iter 70 value 18.034340  
## iter 80 value 18.030828  
## iter 90 value 18.026842  
## iter 100 value 18.025724  
## final value 18.025724   
## stopped after 100 iterations  
## # weights: 289  
## initial value 155.574338   
## iter 10 value 29.746800  
## iter 20 value 19.542326  
## iter 30 value 18.400334  
## iter 40 value 18.166090  
## iter 50 value 18.063900  
## iter 60 value 18.022594  
## iter 70 value 18.014633  
## iter 80 value 18.011194  
## iter 90 value 18.009629  
## iter 100 value 18.009395  
## final value 18.009395   
## stopped after 100 iterations  
## # weights: 307  
## initial value 134.355901   
## iter 10 value 32.594183  
## iter 20 value 20.364583  
## iter 30 value 18.637391  
## iter 40 value 18.288191  
## iter 50 value 18.091117  
## iter 60 value 18.040967  
## iter 70 value 18.011880  
## iter 80 value 18.000558  
## iter 90 value 17.997761  
## iter 100 value 17.997549  
## final value 17.997549   
## stopped after 100 iterations  
## # weights: 325  
## initial value 116.616050   
## iter 10 value 32.295367  
## iter 20 value 19.238471  
## iter 30 value 18.398046  
## iter 40 value 18.126279  
## iter 50 value 18.038327  
## iter 60 value 18.015091  
## iter 70 value 18.008404  
## iter 80 value 18.006738  
## iter 90 value 18.006354  
## iter 100 value 18.006179  
## final value 18.006179   
## stopped after 100 iterations  
## # weights: 343  
## initial value 144.293107   
## iter 10 value 37.914350  
## iter 20 value 21.941324  
## iter 30 value 18.875724  
## iter 40 value 18.408703  
## iter 50 value 18.283474  
## iter 60 value 18.136098  
## iter 70 value 18.073842  
## iter 80 value 18.038211  
## iter 90 value 18.034112  
## iter 100 value 18.033093  
## final value 18.033093   
## stopped after 100 iterations  
## # weights: 361  
## initial value 119.754421   
## iter 10 value 21.909278  
## iter 20 value 18.781845  
## iter 30 value 18.336888  
## iter 40 value 18.205905  
## iter 50 value 18.095393  
## iter 60 value 18.029509  
## iter 70 value 17.971112  
## iter 80 value 17.958281  
## iter 90 value 17.951463  
## iter 100 value 17.947448  
## final value 17.947448   
## stopped after 100 iterations  
## # weights: 19  
## initial value 131.935225   
## iter 10 value 52.013943  
## iter 20 value 33.567870  
## iter 30 value 31.868370  
## iter 40 value 27.827512  
## iter 50 value 24.687667  
## iter 60 value 24.650760  
## iter 70 value 22.132367  
## iter 80 value 22.103377  
## iter 90 value 22.073117  
## iter 100 value 22.061748  
## final value 22.061748   
## stopped after 100 iterations  
## # weights: 37  
## initial value 141.643896   
## iter 10 value 34.098551  
## iter 20 value 14.957454  
## iter 30 value 10.781691  
## iter 40 value 3.970593  
## iter 50 value 3.367983  
## iter 60 value 3.365447  
## iter 70 value 3.365122  
## iter 80 value 3.365063  
## final value 3.365058   
## converged  
## # weights: 55  
## initial value 119.788995   
## iter 10 value 26.831484  
## iter 20 value 15.173206  
## iter 30 value 6.604504  
## iter 40 value 5.314872  
## iter 50 value 4.578229  
## iter 60 value 3.506708  
## iter 70 value 3.431408  
## iter 80 value 3.384060  
## iter 90 value 3.371787  
## iter 100 value 3.367882  
## final value 3.367882   
## stopped after 100 iterations  
## # weights: 73  
## initial value 109.653905   
## iter 10 value 13.703498  
## iter 20 value 3.530047  
## iter 30 value 3.369774  
## iter 40 value 3.365166  
## iter 50 value 3.365091  
## iter 60 value 3.365073  
## final value 3.365058   
## converged  
## # weights: 91  
## initial value 142.969461   
## iter 10 value 15.631916  
## iter 20 value 4.841623  
## iter 30 value 2.719252  
## iter 40 value 0.837173  
## iter 50 value 0.176482  
## iter 60 value 0.039141  
## iter 70 value 0.006486  
## iter 80 value 0.002700  
## iter 90 value 0.000307  
## iter 100 value 0.000145  
## final value 0.000145   
## stopped after 100 iterations  
## # weights: 109  
## initial value 112.168667   
## iter 10 value 20.298933  
## iter 20 value 4.754187  
## iter 30 value 0.731802  
## iter 40 value 0.094789  
## iter 50 value 0.045035  
## iter 60 value 0.016235  
## iter 70 value 0.004419  
## iter 80 value 0.002998  
## iter 90 value 0.001332  
## iter 100 value 0.000506  
## final value 0.000506   
## stopped after 100 iterations  
## # weights: 127  
## initial value 116.197501   
## iter 10 value 13.780692  
## iter 20 value 2.054571  
## iter 30 value 0.016150  
## iter 40 value 0.000825  
## final value 0.000078   
## converged  
## # weights: 145  
## initial value 117.022904   
## iter 10 value 13.898707  
## iter 20 value 2.123705  
## iter 30 value 0.022556  
## iter 40 value 0.002860  
## iter 50 value 0.000522  
## iter 60 value 0.000106  
## iter 60 value 0.000072  
## iter 60 value 0.000072  
## final value 0.000072   
## converged  
## # weights: 163  
## initial value 120.965853   
## iter 10 value 13.683651  
## iter 20 value 0.985186  
## iter 30 value 0.017487  
## iter 40 value 0.002550  
## iter 50 value 0.000195  
## iter 60 value 0.000135  
## final value 0.000042   
## converged  
## # weights: 181  
## initial value 130.387071   
## iter 10 value 12.583717  
## iter 20 value 0.237703  
## iter 30 value 0.007646  
## iter 40 value 0.000365  
## final value 0.000085   
## converged  
## # weights: 199  
## initial value 125.962814   
## iter 10 value 14.032026  
## iter 20 value 0.984858  
## iter 30 value 0.004179  
## final value 0.000097   
## converged  
## # weights: 217  
## initial value 111.025370   
## iter 10 value 14.883858  
## iter 20 value 3.389701  
## iter 30 value 0.310291  
## iter 40 value 0.037144  
## iter 50 value 0.008699  
## iter 60 value 0.003747  
## iter 70 value 0.001743  
## iter 80 value 0.000960  
## iter 90 value 0.000389  
## iter 100 value 0.000205  
## final value 0.000205   
## stopped after 100 iterations  
## # weights: 235  
## initial value 138.114717   
## iter 10 value 18.361278  
## iter 20 value 1.972892  
## iter 30 value 0.027695  
## iter 40 value 0.001626  
## iter 50 value 0.000384  
## final value 0.000079   
## converged  
## # weights: 253  
## initial value 127.629862   
## iter 10 value 13.719056  
## iter 20 value 2.249370  
## iter 30 value 0.008945  
## iter 40 value 0.000652  
## final value 0.000088   
## converged  
## # weights: 271  
## initial value 123.801359   
## iter 10 value 12.507346  
## iter 20 value 0.210387  
## iter 30 value 0.002718  
## final value 0.000098   
## converged  
## # weights: 289  
## initial value 106.352861   
## iter 10 value 10.755393  
## iter 20 value 0.329077  
## iter 30 value 0.006540  
## iter 40 value 0.000388  
## final value 0.000068   
## converged  
## # weights: 307  
## initial value 112.526097   
## iter 10 value 10.486754  
## iter 20 value 0.379509  
## iter 30 value 0.006137  
## iter 40 value 0.000245  
## iter 50 value 0.000119  
## final value 0.000097   
## converged  
## # weights: 325  
## initial value 135.672833   
## iter 10 value 9.699499  
## iter 20 value 0.110868  
## iter 30 value 0.002363  
## iter 40 value 0.000116  
## iter 40 value 0.000095  
## iter 40 value 0.000095  
## final value 0.000095   
## converged  
## # weights: 343  
## initial value 121.260416   
## iter 10 value 10.496148  
## iter 20 value 0.322364  
## iter 30 value 0.001857  
## iter 40 value 0.000349  
## iter 50 value 0.000147  
## final value 0.000080   
## converged  
## # weights: 361  
## initial value 191.481601   
## iter 10 value 11.789144  
## iter 20 value 0.182036  
## iter 30 value 0.003451  
## iter 40 value 0.000212  
## iter 50 value 0.000130  
## final value 0.000088   
## converged  
## # weights: 19  
## initial value 115.909229   
## iter 10 value 37.363604  
## iter 20 value 25.790049  
## iter 30 value 25.372652  
## iter 40 value 25.370998  
## iter 40 value 25.370998  
## final value 25.370998   
## converged  
## # weights: 37  
## initial value 119.277791   
## iter 10 value 24.789613  
## iter 20 value 20.274665  
## iter 30 value 18.988052  
## iter 40 value 18.431195  
## iter 50 value 18.386467  
## iter 60 value 18.385812  
## iter 60 value 18.385812  
## iter 60 value 18.385812  
## final value 18.385812   
## converged  
## # weights: 55  
## initial value 116.498045   
## iter 10 value 40.376403  
## iter 20 value 20.512099  
## iter 30 value 16.382316  
## iter 40 value 15.779972  
## iter 50 value 15.036228  
## iter 60 value 14.459069  
## iter 70 value 14.449124  
## final value 14.449099   
## converged  
## # weights: 73  
## initial value 121.727815   
## iter 10 value 22.212029  
## iter 20 value 16.774931  
## iter 30 value 14.986476  
## iter 40 value 14.464505  
## iter 50 value 14.089892  
## iter 60 value 13.994384  
## iter 70 value 13.992636  
## final value 13.992634   
## converged  
## # weights: 91  
## initial value 149.674644   
## iter 10 value 24.608986  
## iter 20 value 16.965180  
## iter 30 value 15.245711  
## iter 40 value 14.227134  
## iter 50 value 13.898569  
## iter 60 value 13.825812  
## iter 70 value 13.817784  
## iter 80 value 13.814981  
## iter 90 value 13.814861  
## iter 100 value 13.814848  
## final value 13.814848   
## stopped after 100 iterations  
## # weights: 109  
## initial value 122.337237   
## iter 10 value 41.068291  
## iter 20 value 19.556167  
## iter 30 value 15.009081  
## iter 40 value 14.216389  
## iter 50 value 14.069413  
## iter 60 value 14.027281  
## iter 70 value 14.000161  
## iter 80 value 13.995400  
## iter 90 value 13.993287  
## iter 100 value 13.992620  
## final value 13.992620   
## stopped after 100 iterations  
## # weights: 127  
## initial value 126.008270   
## iter 10 value 19.455356  
## iter 20 value 14.673253  
## iter 30 value 13.844101  
## iter 40 value 13.557203  
## iter 50 value 13.316811  
## iter 60 value 13.214213  
## iter 70 value 13.081697  
## iter 80 value 13.026288  
## iter 90 value 13.018836  
## iter 100 value 13.014691  
## final value 13.014691   
## stopped after 100 iterations  
## # weights: 145  
## initial value 135.484985   
## iter 10 value 30.032931  
## iter 20 value 18.565037  
## iter 30 value 14.919126  
## iter 40 value 14.164355  
## iter 50 value 13.805029  
## iter 60 value 13.692940  
## iter 70 value 13.310216  
## iter 80 value 13.139849  
## iter 90 value 13.125470  
## iter 100 value 13.120598  
## final value 13.120598   
## stopped after 100 iterations  
## # weights: 163  
## initial value 138.918825   
## iter 10 value 24.090147  
## iter 20 value 16.442867  
## iter 30 value 14.832473  
## iter 40 value 14.142356  
## iter 50 value 13.809392  
## iter 60 value 13.330000  
## iter 70 value 13.201532  
## iter 80 value 13.182587  
## iter 90 value 13.177386  
## iter 100 value 13.172320  
## final value 13.172320   
## stopped after 100 iterations  
## # weights: 181  
## initial value 125.956966   
## iter 10 value 34.626606  
## iter 20 value 17.198739  
## iter 30 value 14.092307  
## iter 40 value 13.418429  
## iter 50 value 13.189911  
## iter 60 value 13.045746  
## iter 70 value 13.017175  
## iter 80 value 13.008456  
## iter 90 value 13.004907  
## iter 100 value 12.997812  
## final value 12.997812   
## stopped after 100 iterations  
## # weights: 199  
## initial value 146.281544   
## iter 10 value 20.608112  
## iter 20 value 14.783464  
## iter 30 value 13.698297  
## iter 40 value 13.120222  
## iter 50 value 13.053578  
## iter 60 value 13.017442  
## iter 70 value 12.990928  
## iter 80 value 12.966729  
## iter 90 value 12.954126  
## iter 100 value 12.946012  
## final value 12.946012   
## stopped after 100 iterations  
## # weights: 217  
## initial value 123.280837   
## iter 10 value 21.540346  
## iter 20 value 14.609667  
## iter 30 value 13.490112  
## iter 40 value 13.109791  
## iter 50 value 12.978195  
## iter 60 value 12.903002  
## iter 70 value 12.883313  
## iter 80 value 12.861130  
## iter 90 value 12.855323  
## iter 100 value 12.853816  
## final value 12.853816   
## stopped after 100 iterations  
## # weights: 235  
## initial value 145.419566   
## iter 10 value 19.441793  
## iter 20 value 14.405865  
## iter 30 value 13.604702  
## iter 40 value 13.181344  
## iter 50 value 13.007144  
## iter 60 value 12.962375  
## iter 70 value 12.940336  
## iter 80 value 12.931617  
## iter 90 value 12.929649  
## iter 100 value 12.928934  
## final value 12.928934   
## stopped after 100 iterations  
## # weights: 253  
## initial value 151.843449   
## iter 10 value 20.877645  
## iter 20 value 15.001736  
## iter 30 value 13.446169  
## iter 40 value 13.144213  
## iter 50 value 13.046583  
## iter 60 value 13.020816  
## iter 70 value 13.004462  
## iter 80 value 12.985021  
## iter 90 value 12.979848  
## iter 100 value 12.976469  
## final value 12.976469   
## stopped after 100 iterations  
## # weights: 271  
## initial value 120.089754   
## iter 10 value 18.102756  
## iter 20 value 14.367218  
## iter 30 value 13.597707  
## iter 40 value 13.057394  
## iter 50 value 12.976859  
## iter 60 value 12.961263  
## iter 70 value 12.950380  
## iter 80 value 12.947908  
## iter 90 value 12.946962  
## iter 100 value 12.946423  
## final value 12.946423   
## stopped after 100 iterations  
## # weights: 289  
## initial value 155.431592   
## iter 10 value 21.320035  
## iter 20 value 14.687708  
## iter 30 value 13.832062  
## iter 40 value 13.257327  
## iter 50 value 13.036040  
## iter 60 value 12.979221  
## iter 70 value 12.955506  
## iter 80 value 12.946640  
## iter 90 value 12.935805  
## iter 100 value 12.926483  
## final value 12.926483   
## stopped after 100 iterations  
## # weights: 307  
## initial value 122.410926   
## iter 10 value 23.066889  
## iter 20 value 15.449585  
## iter 30 value 14.157436  
## iter 40 value 13.755198  
## iter 50 value 13.555385  
## iter 60 value 13.077210  
## iter 70 value 12.980287  
## iter 80 value 12.950934  
## iter 90 value 12.943917  
## iter 100 value 12.937635  
## final value 12.937635   
## stopped after 100 iterations  
## # weights: 325  
## initial value 116.079920   
## iter 10 value 22.055343  
## iter 20 value 15.041154  
## iter 30 value 13.842406  
## iter 40 value 13.215964  
## iter 50 value 13.045402  
## iter 60 value 13.001775  
## iter 70 value 12.971771  
## iter 80 value 12.947275  
## iter 90 value 12.941136  
## iter 100 value 12.933684  
## final value 12.933684   
## stopped after 100 iterations  
## # weights: 343  
## initial value 150.017001   
## iter 10 value 21.347486  
## iter 20 value 15.367677  
## iter 30 value 13.998944  
## iter 40 value 13.409618  
## iter 50 value 13.115025  
## iter 60 value 12.955026  
## iter 70 value 12.884935  
## iter 80 value 12.868920  
## iter 90 value 12.826917  
## iter 100 value 12.818294  
## final value 12.818294   
## stopped after 100 iterations  
## # weights: 361  
## initial value 119.445528   
## iter 10 value 21.157899  
## iter 20 value 14.875512  
## iter 30 value 13.550215  
## iter 40 value 13.148671  
## iter 50 value 13.016894  
## iter 60 value 12.963554  
## iter 70 value 12.935158  
## iter 80 value 12.920138  
## iter 90 value 12.908826  
## iter 100 value 12.898680  
## final value 12.898680   
## stopped after 100 iterations  
## # weights: 19  
## initial value 120.524278   
## iter 10 value 44.814413  
## iter 20 value 30.883047  
## iter 30 value 29.836476  
## final value 29.834094   
## converged  
## # weights: 37  
## initial value 120.566790   
## iter 10 value 43.996452  
## iter 20 value 31.412209  
## iter 30 value 26.921205  
## iter 40 value 25.202272  
## iter 50 value 25.088395  
## final value 25.088384   
## converged  
## # weights: 55  
## initial value 112.644629   
## iter 10 value 26.614532  
## iter 20 value 22.548615  
## iter 30 value 22.021325  
## iter 40 value 22.003719  
## iter 50 value 22.002877  
## iter 50 value 22.002877  
## iter 50 value 22.002877  
## final value 22.002877   
## converged  
## # weights: 73  
## initial value 120.553337   
## iter 10 value 36.873510  
## iter 20 value 22.957120  
## iter 30 value 21.488071  
## iter 40 value 21.250664  
## iter 50 value 21.093836  
## iter 60 value 21.083808  
## iter 70 value 21.074509  
## iter 80 value 21.072257  
## iter 90 value 21.072144  
## final value 21.072143   
## converged  
## # weights: 91  
## initial value 122.680452   
## iter 10 value 27.244485  
## iter 20 value 21.391995  
## iter 30 value 20.730483  
## iter 40 value 20.492343  
## iter 50 value 20.476981  
## iter 60 value 20.473766  
## iter 70 value 20.473696  
## iter 70 value 20.473696  
## iter 70 value 20.473696  
## final value 20.473696   
## converged  
## # weights: 109  
## initial value 122.922271   
## iter 10 value 28.325452  
## iter 20 value 22.633466  
## iter 30 value 21.351932  
## iter 40 value 20.784994  
## iter 50 value 20.196903  
## iter 60 value 20.091412  
## iter 70 value 20.040445  
## iter 80 value 20.038068  
## iter 90 value 20.037984  
## final value 20.037982   
## converged  
## # weights: 127  
## initial value 118.257355   
## iter 10 value 27.485136  
## iter 20 value 21.389619  
## iter 30 value 20.296310  
## iter 40 value 20.157182  
## iter 50 value 20.106179  
## iter 60 value 20.091427  
## iter 70 value 20.079182  
## iter 80 value 20.078719  
## iter 90 value 20.078668  
## final value 20.078666   
## converged  
## # weights: 145  
## initial value 134.543015   
## iter 10 value 28.394421  
## iter 20 value 21.526126  
## iter 30 value 20.398648  
## iter 40 value 20.240957  
## iter 50 value 20.200724  
## iter 60 value 20.165202  
## iter 70 value 20.153176  
## iter 80 value 20.151278  
## iter 90 value 20.150868  
## iter 100 value 20.150842  
## final value 20.150842   
## stopped after 100 iterations  
## # weights: 163  
## initial value 119.505880   
## iter 10 value 35.265574  
## iter 20 value 21.484997  
## iter 30 value 20.606979  
## iter 40 value 20.150600  
## iter 50 value 20.103134  
## iter 60 value 20.081860  
## iter 70 value 20.079157  
## iter 80 value 20.078842  
## iter 90 value 20.078779  
## iter 100 value 20.078773  
## final value 20.078773   
## stopped after 100 iterations  
## # weights: 181  
## initial value 124.208106   
## iter 10 value 26.161613  
## iter 20 value 21.515006  
## iter 30 value 20.746287  
## iter 40 value 20.012658  
## iter 50 value 19.784711  
## iter 60 value 19.725027  
## iter 70 value 19.717310  
## iter 80 value 19.714462  
## iter 90 value 19.714035  
## iter 100 value 19.713802  
## final value 19.713802   
## stopped after 100 iterations  
## # weights: 199  
## initial value 146.848872   
## iter 10 value 28.641308  
## iter 20 value 21.801294  
## iter 30 value 20.442614  
## iter 40 value 19.772211  
## iter 50 value 19.629666  
## iter 60 value 19.595641  
## iter 70 value 19.583813  
## iter 80 value 19.572497  
## iter 90 value 19.540692  
## iter 100 value 19.539340  
## final value 19.539340   
## stopped after 100 iterations  
## # weights: 217  
## initial value 113.420150   
## iter 10 value 25.770272  
## iter 20 value 20.840851  
## iter 30 value 20.232721  
## iter 40 value 19.997351  
## iter 50 value 19.637969  
## iter 60 value 19.567940  
## iter 70 value 19.556905  
## iter 80 value 19.554871  
## iter 90 value 19.554576  
## iter 100 value 19.554379  
## final value 19.554379   
## stopped after 100 iterations  
## # weights: 235  
## initial value 133.738365   
## iter 10 value 27.338852  
## iter 20 value 20.773503  
## iter 30 value 20.255754  
## iter 40 value 20.008373  
## iter 50 value 19.648624  
## iter 60 value 19.606241  
## iter 70 value 19.566115  
## iter 80 value 19.563977  
## iter 90 value 19.558203  
## iter 100 value 19.554145  
## final value 19.554145   
## stopped after 100 iterations  
## # weights: 253  
## initial value 105.662459   
## iter 10 value 26.369312  
## iter 20 value 21.044419  
## iter 30 value 20.177369  
## iter 40 value 19.720180  
## iter 50 value 19.634185  
## iter 60 value 19.608798  
## iter 70 value 19.602413  
## iter 80 value 19.601500  
## iter 90 value 19.601359  
## iter 100 value 19.601334  
## final value 19.601334   
## stopped after 100 iterations  
## # weights: 271  
## initial value 135.089392   
## iter 10 value 25.024434  
## iter 20 value 21.035955  
## iter 30 value 20.505156  
## iter 40 value 19.846146  
## iter 50 value 19.656582  
## iter 60 value 19.607620  
## iter 70 value 19.586497  
## iter 80 value 19.578761  
## iter 90 value 19.577841  
## iter 100 value 19.577256  
## final value 19.577256   
## stopped after 100 iterations  
## # weights: 289  
## initial value 140.837645   
## iter 10 value 26.480434  
## iter 20 value 21.195407  
## iter 30 value 20.359443  
## iter 40 value 20.226389  
## iter 50 value 20.186395  
## iter 60 value 20.120752  
## iter 70 value 19.840523  
## iter 80 value 19.557615  
## iter 90 value 19.512631  
## iter 100 value 19.488303  
## final value 19.488303   
## stopped after 100 iterations  
## # weights: 307  
## initial value 121.720319   
## iter 10 value 25.096570  
## iter 20 value 20.677237  
## iter 30 value 20.204689  
## iter 40 value 19.918426  
## iter 50 value 19.621799  
## iter 60 value 19.502630  
## iter 70 value 19.488595  
## iter 80 value 19.482426  
## iter 90 value 19.480277  
## iter 100 value 19.479590  
## final value 19.479590   
## stopped after 100 iterations  
## # weights: 325  
## initial value 152.179523   
## iter 10 value 38.410024  
## iter 20 value 23.611195  
## iter 30 value 20.360842  
## iter 40 value 19.704848  
## iter 50 value 19.528077  
## iter 60 value 19.481578  
## iter 70 value 19.469657  
## iter 80 value 19.466401  
## iter 90 value 19.465116  
## iter 100 value 19.464810  
## final value 19.464810   
## stopped after 100 iterations  
## # weights: 343  
## initial value 128.662038   
## iter 10 value 26.273761  
## iter 20 value 20.708514  
## iter 30 value 19.948931  
## iter 40 value 19.676291  
## iter 50 value 19.584201  
## iter 60 value 19.519844  
## iter 70 value 19.466041  
## iter 80 value 19.457265  
## iter 90 value 19.455776  
## iter 100 value 19.455159  
## final value 19.455159   
## stopped after 100 iterations  
## # weights: 361  
## initial value 128.268017   
## iter 10 value 30.876448  
## iter 20 value 21.379036  
## iter 30 value 19.751143  
## iter 40 value 19.552034  
## iter 50 value 19.498854  
## iter 60 value 19.460340  
## iter 70 value 19.453939  
## iter 80 value 19.452995  
## iter 90 value 19.451691  
## iter 100 value 19.451093  
## final value 19.451093   
## stopped after 100 iterations  
## # weights: 19  
## initial value 119.922559   
## iter 10 value 27.910692  
## iter 20 value 17.276054  
## iter 30 value 15.554558  
## iter 40 value 13.145990  
## iter 50 value 13.079285  
## iter 60 value 13.073521  
## iter 70 value 13.069417  
## iter 80 value 13.067805  
## iter 90 value 13.067081  
## iter 100 value 13.066145  
## final value 13.066145   
## stopped after 100 iterations  
## # weights: 37  
## initial value 127.759776   
## iter 10 value 28.827411  
## iter 20 value 13.035453  
## iter 30 value 11.802494  
## iter 40 value 11.791192  
## final value 11.791118   
## converged  
## # weights: 55  
## initial value 122.453044   
## iter 10 value 27.956818  
## iter 20 value 15.696671  
## iter 30 value 4.524155  
## iter 40 value 3.369816  
## iter 50 value 3.365435  
## iter 60 value 3.365239  
## iter 70 value 3.365059  
## final value 3.365058   
## converged  
## # weights: 73  
## initial value 117.227038   
## iter 10 value 21.582644  
## iter 20 value 4.087080  
## iter 30 value 2.516435  
## iter 40 value 2.502566  
## iter 50 value 2.502053  
## final value 2.502012   
## converged  
## # weights: 91  
## initial value 109.448158   
## iter 10 value 17.420341  
## iter 20 value 1.024307  
## iter 30 value 0.026790  
## iter 40 value 0.001902  
## final value 0.000079   
## converged  
## # weights: 109  
## initial value 167.501827   
## iter 10 value 17.833821  
## iter 20 value 0.892957  
## iter 30 value 0.011487  
## final value 0.000056   
## converged  
## # weights: 127  
## initial value 134.292033   
## iter 10 value 13.499167  
## iter 20 value 3.340753  
## iter 30 value 1.404734  
## iter 40 value 1.388031  
## iter 50 value 1.386427  
## final value 1.386294   
## converged  
## # weights: 145  
## initial value 125.214546   
## iter 10 value 16.333851  
## iter 20 value 2.346135  
## iter 30 value 0.185648  
## iter 40 value 0.018381  
## iter 50 value 0.004844  
## iter 60 value 0.001788  
## iter 70 value 0.000705  
## iter 80 value 0.000227  
## iter 90 value 0.000150  
## final value 0.000097   
## converged  
## # weights: 163  
## initial value 162.290171   
## iter 10 value 8.923627  
## iter 20 value 0.443947  
## iter 30 value 0.007566  
## iter 40 value 0.000428  
## iter 50 value 0.000192  
## final value 0.000094   
## converged  
## # weights: 181  
## initial value 108.774994   
## iter 10 value 12.134420  
## iter 20 value 0.914452  
## iter 30 value 0.006252  
## iter 40 value 0.000270  
## final value 0.000096   
## converged  
## # weights: 199  
## initial value 134.154773   
## iter 10 value 13.345491  
## iter 20 value 1.736191  
## iter 30 value 0.007812  
## iter 40 value 0.000299  
## final value 0.000098   
## converged  
## # weights: 217  
## initial value 193.403806   
## iter 10 value 12.341746  
## iter 20 value 0.206796  
## iter 30 value 0.002472  
## iter 40 value 0.000186  
## final value 0.000095   
## converged  
## # weights: 235  
## initial value 167.038232   
## iter 10 value 11.241676  
## iter 20 value 0.619329  
## iter 30 value 0.014619  
## iter 40 value 0.002398  
## iter 50 value 0.000118  
## final value 0.000083   
## converged  
## # weights: 253  
## initial value 118.305938   
## iter 10 value 14.935619  
## iter 20 value 0.476704  
## iter 30 value 0.007110  
## iter 40 value 0.000192  
## final value 0.000093   
## converged  
## # weights: 271  
## initial value 142.477542   
## iter 10 value 14.343123  
## iter 20 value 0.198402  
## iter 30 value 0.002854  
## iter 40 value 0.000343  
## final value 0.000068   
## converged  
## # weights: 289  
## initial value 102.168551   
## iter 10 value 20.484492  
## iter 20 value 1.008371  
## iter 30 value 0.004611  
## iter 40 value 0.000743  
## iter 50 value 0.000288  
## final value 0.000086   
## converged  
## # weights: 307  
## initial value 116.589369   
## iter 10 value 7.266052  
## iter 20 value 0.184715  
## iter 30 value 0.003901  
## iter 40 value 0.000519  
## iter 50 value 0.000131  
## final value 0.000086   
## converged  
## # weights: 325  
## initial value 118.953307   
## iter 10 value 11.754226  
## iter 20 value 0.212021  
## iter 30 value 0.003614  
## final value 0.000078   
## converged  
## # weights: 343  
## initial value 113.820085   
## iter 10 value 14.055352  
## iter 20 value 0.917463  
## iter 30 value 0.012390  
## iter 40 value 0.000513  
## iter 50 value 0.000247  
## final value 0.000052   
## converged  
## # weights: 361  
## initial value 197.254322   
## iter 10 value 10.809277  
## iter 20 value 0.833906  
## iter 30 value 0.015333  
## iter 40 value 0.000753  
## iter 50 value 0.000192  
## final value 0.000090   
## converged  
## # weights: 19  
## initial value 112.461545   
## iter 10 value 32.997944  
## iter 20 value 26.527296  
## iter 30 value 25.726275  
## final value 25.726059   
## converged  
## # weights: 37  
## initial value 129.556548   
## iter 10 value 38.067918  
## iter 20 value 21.290759  
## iter 30 value 19.514127  
## iter 40 value 19.477382  
## iter 50 value 19.475699  
## final value 19.475694   
## converged  
## # weights: 55  
## initial value 148.705291   
## iter 10 value 41.720895  
## iter 20 value 27.152912  
## iter 30 value 20.400098  
## iter 40 value 19.474782  
## iter 50 value 19.174750  
## iter 60 value 18.718038  
## iter 70 value 18.631048  
## iter 80 value 18.626518  
## final value 18.626517   
## converged  
## # weights: 73  
## initial value 122.626266   
## iter 10 value 26.335371  
## iter 20 value 19.954697  
## iter 30 value 16.642403  
## iter 40 value 15.045638  
## iter 50 value 14.668067  
## iter 60 value 14.643700  
## iter 70 value 14.633962  
## iter 80 value 14.633665  
## iter 90 value 14.633624  
## final value 14.633624   
## converged  
## # weights: 91  
## initial value 114.743658   
## iter 10 value 29.404821  
## iter 20 value 17.275785  
## iter 30 value 16.096298  
## iter 40 value 15.885254  
## iter 50 value 15.753863  
## iter 60 value 15.323445  
## iter 70 value 14.556494  
## iter 80 value 14.410424  
## iter 90 value 14.367433  
## iter 100 value 14.339487  
## final value 14.339487   
## stopped after 100 iterations  
## # weights: 109  
## initial value 118.977021   
## iter 10 value 19.017051  
## iter 20 value 15.614090  
## iter 30 value 14.733989  
## iter 40 value 14.168625  
## iter 50 value 13.765059  
## iter 60 value 13.712220  
## iter 70 value 13.710374  
## iter 80 value 13.710233  
## final value 13.710224   
## converged  
## # weights: 127  
## initial value 135.594045   
## iter 10 value 26.789512  
## iter 20 value 15.905853  
## iter 30 value 14.091598  
## iter 40 value 13.505169  
## iter 50 value 13.412522  
## iter 60 value 13.346791  
## iter 70 value 13.339000  
## iter 80 value 13.337134  
## iter 90 value 13.336672  
## iter 100 value 13.336627  
## final value 13.336627   
## stopped after 100 iterations  
## # weights: 145  
## initial value 128.689031   
## iter 10 value 25.561040  
## iter 20 value 15.958506  
## iter 30 value 14.539457  
## iter 40 value 13.975391  
## iter 50 value 13.635149  
## iter 60 value 13.536313  
## iter 70 value 13.472875  
## iter 80 value 13.316823  
## iter 90 value 13.229126  
## iter 100 value 13.216620  
## final value 13.216620   
## stopped after 100 iterations  
## # weights: 163  
## initial value 120.928610   
## iter 10 value 22.143239  
## iter 20 value 16.066966  
## iter 30 value 14.418485  
## iter 40 value 13.991183  
## iter 50 value 13.871689  
## iter 60 value 13.625410  
## iter 70 value 13.370681  
## iter 80 value 13.284352  
## iter 90 value 13.246272  
## iter 100 value 13.209456  
## final value 13.209456   
## stopped after 100 iterations  
## # weights: 181  
## initial value 135.644378   
## iter 10 value 20.279742  
## iter 20 value 14.540459  
## iter 30 value 13.725969  
## iter 40 value 13.384930  
## iter 50 value 13.202864  
## iter 60 value 13.103280  
## iter 70 value 13.018696  
## iter 80 value 12.995586  
## iter 90 value 12.993375  
## iter 100 value 12.992810  
## final value 12.992810   
## stopped after 100 iterations  
## # weights: 199  
## initial value 108.992728   
## iter 10 value 19.596176  
## iter 20 value 14.574415  
## iter 30 value 13.723046  
## iter 40 value 13.216123  
## iter 50 value 13.001507  
## iter 60 value 12.987690  
## iter 70 value 12.986488  
## iter 80 value 12.986170  
## iter 90 value 12.985894  
## iter 100 value 12.985868  
## final value 12.985868   
## stopped after 100 iterations  
## # weights: 217  
## initial value 149.725581   
## iter 10 value 24.483764  
## iter 20 value 14.979980  
## iter 30 value 13.948402  
## iter 40 value 13.312201  
## iter 50 value 13.087763  
## iter 60 value 13.036833  
## iter 70 value 13.018212  
## iter 80 value 12.997700  
## iter 90 value 12.992245  
## iter 100 value 12.987776  
## final value 12.987776   
## stopped after 100 iterations  
## # weights: 235  
## initial value 136.924685   
## iter 10 value 27.988933  
## iter 20 value 16.915212  
## iter 30 value 14.239133  
## iter 40 value 13.431423  
## iter 50 value 13.200090  
## iter 60 value 13.072238  
## iter 70 value 13.042320  
## iter 80 value 13.010605  
## iter 90 value 12.982023  
## iter 100 value 12.968953  
## final value 12.968953   
## stopped after 100 iterations  
## # weights: 253  
## initial value 129.311915   
## iter 10 value 23.018024  
## iter 20 value 14.309070  
## iter 30 value 13.390580  
## iter 40 value 13.147582  
## iter 50 value 13.015407  
## iter 60 value 12.983716  
## iter 70 value 12.964266  
## iter 80 value 12.956794  
## iter 90 value 12.953408  
## iter 100 value 12.944870  
## final value 12.944870   
## stopped after 100 iterations  
## # weights: 271  
## initial value 125.731751   
## iter 10 value 21.687478  
## iter 20 value 14.499598  
## iter 30 value 13.475990  
## iter 40 value 13.158249  
## iter 50 value 13.058111  
## iter 60 value 12.982711  
## iter 70 value 12.950131  
## iter 80 value 12.937218  
## iter 90 value 12.925339  
## iter 100 value 12.917177  
## final value 12.917177   
## stopped after 100 iterations  
## # weights: 289  
## initial value 181.823349   
## iter 10 value 22.537698  
## iter 20 value 15.031740  
## iter 30 value 13.850048  
## iter 40 value 13.215622  
## iter 50 value 13.099021  
## iter 60 value 13.001366  
## iter 70 value 12.933321  
## iter 80 value 12.922081  
## iter 90 value 12.918845  
## iter 100 value 12.914794  
## final value 12.914794   
## stopped after 100 iterations  
## # weights: 307  
## initial value 171.821676   
## iter 10 value 28.418098  
## iter 20 value 15.750780  
## iter 30 value 14.182203  
## iter 40 value 13.435837  
## iter 50 value 13.175619  
## iter 60 value 13.079847  
## iter 70 value 13.053111  
## iter 80 value 13.048973  
## iter 90 value 13.046511  
## iter 100 value 13.045398  
## final value 13.045398   
## stopped after 100 iterations  
## # weights: 325  
## initial value 140.528847   
## iter 10 value 23.080847  
## iter 20 value 14.692856  
## iter 30 value 13.679850  
## iter 40 value 13.229527  
## iter 50 value 13.138377  
## iter 60 value 13.094180  
## iter 70 value 13.086374  
## iter 80 value 13.083746  
## iter 90 value 13.082021  
## iter 100 value 13.080546  
## final value 13.080546   
## stopped after 100 iterations  
## # weights: 343  
## initial value 126.364644   
## iter 10 value 21.985519  
## iter 20 value 15.668754  
## iter 30 value 13.581581  
## iter 40 value 13.157950  
## iter 50 value 13.079693  
## iter 60 value 13.053751  
## iter 70 value 13.048860  
## iter 80 value 13.046995  
## iter 90 value 13.045676  
## iter 100 value 13.040560  
## final value 13.040560   
## stopped after 100 iterations  
## # weights: 361  
## initial value 149.366488   
## iter 10 value 22.490739  
## iter 20 value 15.717392  
## iter 30 value 14.210048  
## iter 40 value 13.790934  
## iter 50 value 13.229441  
## iter 60 value 13.008822  
## iter 70 value 12.925900  
## iter 80 value 12.887752  
## iter 90 value 12.871249  
## iter 100 value 12.866132  
## final value 12.866132   
## stopped after 100 iterations  
## # weights: 19  
## initial value 113.864233   
## iter 10 value 42.860619  
## iter 20 value 31.600579  
## iter 30 value 30.548223  
## final value 30.548203   
## converged  
## # weights: 37  
## initial value 128.920005   
## iter 10 value 47.679760  
## iter 20 value 28.237459  
## iter 30 value 26.198458  
## iter 40 value 25.818778  
## iter 50 value 25.805789  
## final value 25.805668   
## converged  
## # weights: 55  
## initial value 133.478168   
## iter 10 value 46.523089  
## iter 20 value 29.497340  
## iter 30 value 24.218523  
## iter 40 value 23.792894  
## iter 50 value 23.349563  
## iter 60 value 23.289094  
## iter 70 value 23.285515  
## iter 80 value 23.285299  
## iter 90 value 23.285265  
## iter 90 value 23.285265  
## iter 90 value 23.285265  
## final value 23.285265   
## converged  
## # weights: 73  
## initial value 112.954076   
## iter 10 value 32.687965  
## iter 20 value 25.300452  
## iter 30 value 23.140768  
## iter 40 value 22.251701  
## iter 50 value 22.234224  
## iter 60 value 22.234132  
## iter 70 value 22.233482  
## iter 80 value 22.232592  
## iter 90 value 22.127841  
## iter 100 value 21.891408  
## final value 21.891408   
## stopped after 100 iterations  
## # weights: 91  
## initial value 114.967101   
## iter 10 value 27.781886  
## iter 20 value 22.824590  
## iter 30 value 21.602743  
## iter 40 value 20.910064  
## iter 50 value 20.681707  
## iter 60 value 20.456832  
## iter 70 value 20.424245  
## iter 80 value 20.422510  
## iter 90 value 20.422307  
## final value 20.422306   
## converged  
## # weights: 109  
## initial value 116.619741   
## iter 10 value 29.874853  
## iter 20 value 22.549891  
## iter 30 value 21.384530  
## iter 40 value 20.957014  
## iter 50 value 20.676659  
## iter 60 value 20.566808  
## iter 70 value 20.559399  
## iter 80 value 20.558420  
## iter 90 value 20.558272  
## final value 20.558271   
## converged  
## # weights: 127  
## initial value 109.430156   
## iter 10 value 26.186661  
## iter 20 value 21.618458  
## iter 30 value 20.706783  
## iter 40 value 20.332239  
## iter 50 value 20.268954  
## iter 60 value 20.249606  
## iter 70 value 20.248295  
## final value 20.248294   
## converged  
## # weights: 145  
## initial value 134.470733   
## iter 10 value 27.966304  
## iter 20 value 21.602420  
## iter 30 value 20.668584  
## iter 40 value 20.357865  
## iter 50 value 20.217045  
## iter 60 value 20.175555  
## iter 70 value 20.090155  
## iter 80 value 19.984628  
## iter 90 value 19.915245  
## iter 100 value 19.913689  
## final value 19.913689   
## stopped after 100 iterations  
## # weights: 163  
## initial value 149.928251   
## iter 10 value 28.018562  
## iter 20 value 21.982627  
## iter 30 value 20.550545  
## iter 40 value 20.295384  
## iter 50 value 20.265767  
## iter 60 value 20.258400  
## iter 70 value 20.249639  
## iter 80 value 20.166419  
## iter 90 value 20.071852  
## iter 100 value 20.024551  
## final value 20.024551   
## stopped after 100 iterations  
## # weights: 181  
## initial value 144.895088   
## iter 10 value 24.828511  
## iter 20 value 20.749182  
## iter 30 value 20.250669  
## iter 40 value 20.064207  
## iter 50 value 20.024154  
## iter 60 value 19.935195  
## iter 70 value 19.894900  
## iter 80 value 19.851893  
## iter 90 value 19.826877  
## iter 100 value 19.825858  
## final value 19.825858   
## stopped after 100 iterations  
## # weights: 199  
## initial value 162.934618   
## iter 10 value 27.162154  
## iter 20 value 21.199820  
## iter 30 value 20.457745  
## iter 40 value 20.188878  
## iter 50 value 20.149417  
## iter 60 value 20.142379  
## iter 70 value 20.114752  
## iter 80 value 19.978443  
## iter 90 value 19.946614  
## iter 100 value 19.815867  
## final value 19.815867   
## stopped after 100 iterations  
## # weights: 217  
## initial value 133.677942   
## iter 10 value 26.231762  
## iter 20 value 20.976850  
## iter 30 value 20.330365  
## iter 40 value 20.242469  
## iter 50 value 20.207493  
## iter 60 value 20.167063  
## iter 70 value 20.160521  
## iter 80 value 20.096610  
## iter 90 value 20.000346  
## iter 100 value 19.965476  
## final value 19.965476   
## stopped after 100 iterations  
## # weights: 235  
## initial value 133.883364   
## iter 10 value 30.680336  
## iter 20 value 21.218389  
## iter 30 value 20.330981  
## iter 40 value 20.006972  
## iter 50 value 19.865646  
## iter 60 value 19.805894  
## iter 70 value 19.790142  
## iter 80 value 19.786858  
## iter 90 value 19.786493  
## iter 100 value 19.785060  
## final value 19.785060   
## stopped after 100 iterations  
## # weights: 253  
## initial value 147.191208   
## iter 10 value 31.438564  
## iter 20 value 21.857739  
## iter 30 value 20.058215  
## iter 40 value 19.863170  
## iter 50 value 19.833699  
## iter 60 value 19.827667  
## iter 70 value 19.809359  
## iter 80 value 19.804126  
## iter 90 value 19.802360  
## iter 100 value 19.801984  
## final value 19.801984   
## stopped after 100 iterations  
## # weights: 271  
## initial value 131.256010   
## iter 10 value 24.917612  
## iter 20 value 20.673055  
## iter 30 value 20.207774  
## iter 40 value 19.898242  
## iter 50 value 19.811288  
## iter 60 value 19.779475  
## iter 70 value 19.771994  
## iter 80 value 19.769445  
## iter 90 value 19.768209  
## iter 100 value 19.768050  
## final value 19.768050   
## stopped after 100 iterations  
## # weights: 289  
## initial value 144.263761   
## iter 10 value 28.036644  
## iter 20 value 21.511962  
## iter 30 value 20.587555  
## iter 40 value 20.271635  
## iter 50 value 20.186919  
## iter 60 value 20.159601  
## iter 70 value 20.056658  
## iter 80 value 19.977542  
## iter 90 value 19.968137  
## iter 100 value 19.954327  
## final value 19.954327   
## stopped after 100 iterations  
## # weights: 307  
## initial value 146.191597   
## iter 10 value 25.159081  
## iter 20 value 20.692640  
## iter 30 value 20.149865  
## iter 40 value 19.915074  
## iter 50 value 19.826852  
## iter 60 value 19.802504  
## iter 70 value 19.796314  
## iter 80 value 19.794134  
## iter 90 value 19.792969  
## iter 100 value 19.792299  
## final value 19.792299   
## stopped after 100 iterations  
## # weights: 325  
## initial value 159.540840   
## iter 10 value 25.763276  
## iter 20 value 20.422198  
## iter 30 value 19.894417  
## iter 40 value 19.810482  
## iter 50 value 19.796049  
## iter 60 value 19.791628  
## iter 70 value 19.789840  
## iter 80 value 19.787422  
## iter 90 value 19.786488  
## iter 100 value 19.786318  
## final value 19.786318   
## stopped after 100 iterations  
## # weights: 343  
## initial value 127.763010   
## iter 10 value 25.110413  
## iter 20 value 20.813570  
## iter 30 value 20.092690  
## iter 40 value 19.875993  
## iter 50 value 19.827033  
## iter 60 value 19.761475  
## iter 70 value 19.745765  
## iter 80 value 19.741241  
## iter 90 value 19.739065  
## iter 100 value 19.738937  
## final value 19.738937   
## stopped after 100 iterations  
## # weights: 361  
## initial value 118.833993   
## iter 10 value 23.861340  
## iter 20 value 20.176180  
## iter 30 value 19.811765  
## iter 40 value 19.767917  
## iter 50 value 19.753537  
## iter 60 value 19.749026  
## iter 70 value 19.746410  
## iter 80 value 19.745842  
## iter 90 value 19.745306  
## iter 100 value 19.737067  
## final value 19.737067   
## stopped after 100 iterations  
## # weights: 19  
## initial value 120.066747   
## iter 10 value 42.026815  
## iter 20 value 17.925567  
## iter 30 value 16.402024  
## iter 40 value 14.561556  
## iter 50 value 13.523907  
## iter 60 value 13.393552  
## iter 70 value 13.346327  
## iter 80 value 13.203902  
## iter 90 value 13.195825  
## iter 100 value 13.185626  
## final value 13.185626   
## stopped after 100 iterations  
## # weights: 37  
## initial value 109.916612   
## iter 10 value 27.670535  
## iter 20 value 11.509698  
## iter 30 value 7.419254  
## iter 40 value 7.180953  
## iter 50 value 6.111317  
## iter 60 value 6.109444  
## iter 70 value 6.108945  
## iter 80 value 6.108815  
## iter 90 value 6.108711  
## final value 6.108707   
## converged  
## # weights: 55  
## initial value 118.276796   
## iter 10 value 24.757694  
## iter 20 value 9.959915  
## iter 30 value 3.696497  
## iter 40 value 3.372989  
## iter 50 value 3.365557  
## iter 60 value 3.365096  
## final value 3.365065   
## converged  
## # weights: 73  
## initial value 126.217637   
## iter 10 value 17.786321  
## iter 20 value 4.406213  
## iter 30 value 3.390356  
## iter 40 value 3.365166  
## final value 3.365059   
## converged  
## # weights: 91  
## initial value 116.771493   
## iter 10 value 17.861706  
## iter 20 value 2.755966  
## iter 30 value 0.146001  
## iter 40 value 0.024578  
## iter 50 value 0.018803  
## iter 60 value 0.010502  
## iter 70 value 0.002312  
## iter 80 value 0.001355  
## iter 90 value 0.000856  
## iter 100 value 0.000441  
## final value 0.000441   
## stopped after 100 iterations  
## # weights: 109  
## initial value 129.765426   
## iter 10 value 24.972354  
## iter 20 value 8.432211  
## iter 30 value 5.349899  
## iter 40 value 3.578179  
## iter 50 value 3.336716  
## iter 60 value 3.284725  
## iter 70 value 2.340992  
## iter 80 value 2.242008  
## iter 90 value 0.053906  
## iter 100 value 0.003949  
## final value 0.003949   
## stopped after 100 iterations  
## # weights: 127  
## initial value 125.672974   
## iter 10 value 11.831117  
## iter 20 value 0.224798  
## iter 30 value 0.001326  
## final value 0.000051   
## converged  
## # weights: 145  
## initial value 116.364636   
## iter 10 value 22.168898  
## iter 20 value 8.396527  
## iter 30 value 2.853628  
## iter 40 value 0.068492  
## iter 50 value 0.007112  
## iter 60 value 0.001230  
## iter 70 value 0.000450  
## iter 80 value 0.000257  
## final value 0.000065   
## converged  
## # weights: 163  
## initial value 115.989996   
## iter 10 value 17.720810  
## iter 20 value 2.261244  
## iter 30 value 0.011600  
## iter 40 value 0.000884  
## final value 0.000082   
## converged  
## # weights: 181  
## initial value 138.793699   
## iter 10 value 15.921842  
## iter 20 value 4.048240  
## iter 30 value 0.027771  
## iter 40 value 0.001799  
## final value 0.000094   
## converged  
## # weights: 199  
## initial value 127.988150   
## iter 10 value 15.221573  
## iter 20 value 0.742772  
## iter 30 value 0.011473  
## iter 40 value 0.000599  
## iter 50 value 0.000173  
## final value 0.000092   
## converged  
## # weights: 217  
## initial value 126.958657   
## iter 10 value 15.165615  
## iter 20 value 0.239304  
## iter 30 value 0.002255  
## final value 0.000074   
## converged  
## # weights: 235  
## initial value 134.802653   
## iter 10 value 20.804627  
## iter 20 value 1.167140  
## iter 30 value 0.010316  
## iter 40 value 0.001114  
## final value 0.000099   
## converged  
## # weights: 253  
## initial value 141.144278   
## iter 10 value 15.201846  
## iter 20 value 0.445704  
## iter 30 value 0.004920  
## iter 40 value 0.000729  
## final value 0.000068   
## converged  
## # weights: 271  
## initial value 150.314417   
## iter 10 value 25.032486  
## iter 20 value 5.578236  
## iter 30 value 0.154731  
## iter 40 value 0.012757  
## iter 50 value 0.000512  
## final value 0.000070   
## converged  
## # weights: 289  
## initial value 121.445547   
## iter 10 value 9.538156  
## iter 20 value 0.379888  
## iter 30 value 0.010894  
## iter 40 value 0.000945  
## iter 50 value 0.000165  
## final value 0.000099   
## converged  
## # weights: 307  
## initial value 128.879301   
## iter 10 value 11.469096  
## iter 20 value 0.157421  
## iter 30 value 0.001386  
## iter 40 value 0.000110  
## iter 40 value 0.000088  
## iter 40 value 0.000088  
## final value 0.000088   
## converged  
## # weights: 325  
## initial value 120.688482   
## iter 10 value 11.312201  
## iter 20 value 1.010230  
## iter 30 value 0.022331  
## iter 40 value 0.002017  
## iter 50 value 0.000686  
## iter 60 value 0.000145  
## final value 0.000081   
## converged  
## # weights: 343  
## initial value 112.887711   
## iter 10 value 13.403006  
## iter 20 value 1.412659  
## iter 30 value 0.028592  
## iter 40 value 0.003614  
## iter 50 value 0.000219  
## final value 0.000091   
## converged  
## # weights: 361  
## initial value 168.945295   
## iter 10 value 10.067817  
## iter 20 value 0.191487  
## iter 30 value 0.003620  
## iter 40 value 0.000361  
## iter 50 value 0.000149  
## final value 0.000082   
## converged  
## # weights: 19  
## initial value 121.349468   
## iter 10 value 41.900731  
## iter 20 value 28.148884  
## iter 30 value 26.977572  
## iter 40 value 26.950502  
## iter 40 value 26.950502  
## final value 26.950502   
## converged  
## # weights: 37  
## initial value 120.113898   
## iter 10 value 48.467108  
## iter 20 value 25.952967  
## iter 30 value 22.704577  
## iter 40 value 21.532398  
## iter 50 value 21.417711  
## iter 60 value 21.330013  
## iter 70 value 21.290961  
## iter 80 value 21.290387  
## iter 90 value 21.290346  
## final value 21.290341   
## converged  
## # weights: 55  
## initial value 121.767309   
## iter 10 value 27.613813  
## iter 20 value 20.396588  
## iter 30 value 18.090892  
## iter 40 value 16.708943  
## iter 50 value 16.594491  
## iter 60 value 16.584278  
## final value 16.584275   
## converged  
## # weights: 73  
## initial value 117.571378   
## iter 10 value 39.038829  
## iter 20 value 21.631962  
## iter 30 value 17.549589  
## iter 40 value 16.910627  
## iter 50 value 16.873333  
## iter 60 value 16.866531  
## iter 70 value 16.865910  
## iter 80 value 16.865896  
## final value 16.865895   
## converged  
## # weights: 91  
## initial value 114.905932   
## iter 10 value 29.399476  
## iter 20 value 18.662201  
## iter 30 value 16.577626  
## iter 40 value 15.647159  
## iter 50 value 15.249253  
## iter 60 value 15.162475  
## iter 70 value 15.158528  
## iter 80 value 15.157832  
## iter 90 value 15.157820  
## final value 15.157820   
## converged  
## # weights: 109  
## initial value 161.030375   
## iter 10 value 26.472786  
## iter 20 value 17.923993  
## iter 30 value 15.978599  
## iter 40 value 15.743253  
## iter 50 value 15.700912  
## iter 60 value 15.682657  
## iter 70 value 15.681073  
## iter 80 value 15.678974  
## iter 90 value 15.678846  
## iter 100 value 15.678837  
## final value 15.678837   
## stopped after 100 iterations  
## # weights: 127  
## initial value 120.684386   
## iter 10 value 46.310197  
## iter 20 value 22.328961  
## iter 30 value 18.152441  
## iter 40 value 15.722835  
## iter 50 value 14.703842  
## iter 60 value 14.526704  
## iter 70 value 14.467947  
## iter 80 value 14.435122  
## iter 90 value 14.224025  
## iter 100 value 14.120152  
## final value 14.120152   
## stopped after 100 iterations  
## # weights: 145  
## initial value 127.600123   
## iter 10 value 23.809894  
## iter 20 value 16.880247  
## iter 30 value 15.288600  
## iter 40 value 14.704786  
## iter 50 value 14.245314  
## iter 60 value 14.105083  
## iter 70 value 14.026738  
## iter 80 value 14.009360  
## iter 90 value 13.995058  
## iter 100 value 13.990134  
## final value 13.990134   
## stopped after 100 iterations  
## # weights: 163  
## initial value 133.350557   
## iter 10 value 32.225239  
## iter 20 value 17.068656  
## iter 30 value 15.090942  
## iter 40 value 14.532219  
## iter 50 value 14.408087  
## iter 60 value 14.368250  
## iter 70 value 14.347580  
## iter 80 value 14.344513  
## iter 90 value 14.343201  
## iter 100 value 14.340910  
## final value 14.340910   
## stopped after 100 iterations  
## # weights: 181  
## initial value 117.926074   
## iter 10 value 19.360665  
## iter 20 value 15.553492  
## iter 30 value 14.824798  
## iter 40 value 14.221006  
## iter 50 value 14.103469  
## iter 60 value 14.041910  
## iter 70 value 14.009887  
## iter 80 value 14.006921  
## iter 90 value 14.005737  
## iter 100 value 14.005011  
## final value 14.005011   
## stopped after 100 iterations  
## # weights: 199  
## initial value 138.088232   
## iter 10 value 24.014120  
## iter 20 value 16.272385  
## iter 30 value 15.249589  
## iter 40 value 14.387406  
## iter 50 value 14.204228  
## iter 60 value 14.026298  
## iter 70 value 13.995361  
## iter 80 value 13.990101  
## iter 90 value 13.981592  
## iter 100 value 13.937282  
## final value 13.937282   
## stopped after 100 iterations  
## # weights: 217  
## initial value 127.875167   
## iter 10 value 23.890468  
## iter 20 value 16.742472  
## iter 30 value 15.353504  
## iter 40 value 14.695442  
## iter 50 value 14.491046  
## iter 60 value 14.346276  
## iter 70 value 14.120242  
## iter 80 value 13.907246  
## iter 90 value 13.878540  
## iter 100 value 13.874576  
## final value 13.874576   
## stopped after 100 iterations  
## # weights: 235  
## initial value 137.651513   
## iter 10 value 28.361236  
## iter 20 value 17.437226  
## iter 30 value 15.019794  
## iter 40 value 14.252425  
## iter 50 value 14.104401  
## iter 60 value 14.012866  
## iter 70 value 13.966410  
## iter 80 value 13.953110  
## iter 90 value 13.948167  
## iter 100 value 13.943643  
## final value 13.943643   
## stopped after 100 iterations  
## # weights: 253  
## initial value 118.502425   
## iter 10 value 24.432854  
## iter 20 value 15.808872  
## iter 30 value 14.660416  
## iter 40 value 14.319024  
## iter 50 value 14.114343  
## iter 60 value 14.005606  
## iter 70 value 13.937432  
## iter 80 value 13.891048  
## iter 90 value 13.879814  
## iter 100 value 13.874537  
## final value 13.874537   
## stopped after 100 iterations  
## # weights: 271  
## initial value 131.787077   
## iter 10 value 21.840196  
## iter 20 value 15.590973  
## iter 30 value 14.395339  
## iter 40 value 14.049876  
## iter 50 value 13.894230  
## iter 60 value 13.861488  
## iter 70 value 13.845346  
## iter 80 value 13.834006  
## iter 90 value 13.823363  
## iter 100 value 13.822314  
## final value 13.822314   
## stopped after 100 iterations  
## # weights: 289  
## initial value 158.916477   
## iter 10 value 25.623551  
## iter 20 value 16.436221  
## iter 30 value 15.013970  
## iter 40 value 14.320030  
## iter 50 value 14.055227  
## iter 60 value 13.960167  
## iter 70 value 13.932899  
## iter 80 value 13.890025  
## iter 90 value 13.868686  
## iter 100 value 13.858337  
## final value 13.858337   
## stopped after 100 iterations  
## # weights: 307  
## initial value 114.901481   
## iter 10 value 24.017215  
## iter 20 value 15.706999  
## iter 30 value 14.650280  
## iter 40 value 14.098893  
## iter 50 value 13.960396  
## iter 60 value 13.882228  
## iter 70 value 13.856806  
## iter 80 value 13.848222  
## iter 90 value 13.845033  
## iter 100 value 13.841463  
## final value 13.841463   
## stopped after 100 iterations  
## # weights: 325  
## initial value 148.264103   
## iter 10 value 27.869424  
## iter 20 value 17.038878  
## iter 30 value 15.251348  
## iter 40 value 14.448459  
## iter 50 value 14.081197  
## iter 60 value 13.933511  
## iter 70 value 13.864713  
## iter 80 value 13.832235  
## iter 90 value 13.773676  
## iter 100 value 13.759316  
## final value 13.759316   
## stopped after 100 iterations  
## # weights: 343  
## initial value 221.803322   
## iter 10 value 24.073808  
## iter 20 value 16.059345  
## iter 30 value 15.006983  
## iter 40 value 14.587671  
## iter 50 value 14.140199  
## iter 60 value 13.951837  
## iter 70 value 13.859986  
## iter 80 value 13.837632  
## iter 90 value 13.830172  
## iter 100 value 13.825791  
## final value 13.825791   
## stopped after 100 iterations  
## # weights: 361  
## initial value 116.933409   
## iter 10 value 21.872715  
## iter 20 value 15.396863  
## iter 30 value 14.559334  
## iter 40 value 14.191221  
## iter 50 value 14.049241  
## iter 60 value 13.971357  
## iter 70 value 13.932828  
## iter 80 value 13.918440  
## iter 90 value 13.908524  
## iter 100 value 13.904909  
## final value 13.904909   
## stopped after 100 iterations  
## # weights: 19  
## initial value 130.499333   
## iter 10 value 42.542191  
## iter 20 value 33.173200  
## iter 30 value 32.033063  
## iter 40 value 31.574214  
## iter 50 value 31.569694  
## final value 31.569669   
## converged  
## # weights: 37  
## initial value 119.860983   
## iter 10 value 49.676574  
## iter 20 value 28.487595  
## iter 30 value 27.397978  
## iter 40 value 27.277548  
## final value 27.277181   
## converged  
## # weights: 55  
## initial value 116.702324   
## iter 10 value 50.014457  
## iter 20 value 30.120990  
## iter 30 value 26.804774  
## iter 40 value 24.269078  
## iter 50 value 23.894483  
## iter 60 value 23.431768  
## iter 70 value 23.325554  
## iter 80 value 23.308094  
## iter 90 value 23.305473  
## final value 23.305383   
## converged  
## # weights: 73  
## initial value 116.217690   
## iter 10 value 35.305281  
## iter 20 value 27.544247  
## iter 30 value 25.097075  
## iter 40 value 24.089041  
## iter 50 value 23.552901  
## iter 60 value 23.104081  
## iter 70 value 23.083280  
## iter 80 value 23.076309  
## iter 90 value 23.068517  
## iter 100 value 23.068021  
## final value 23.068021   
## stopped after 100 iterations  
## # weights: 91  
## initial value 148.915868   
## iter 10 value 28.891918  
## iter 20 value 23.292356  
## iter 30 value 22.161355  
## iter 40 value 21.904841  
## iter 50 value 21.826103  
## iter 60 value 21.820335  
## iter 70 value 21.820043  
## iter 70 value 21.820043  
## iter 70 value 21.820043  
## final value 21.820043   
## converged  
## # weights: 109  
## initial value 136.869861   
## iter 10 value 31.512694  
## iter 20 value 23.230369  
## iter 30 value 22.173271  
## iter 40 value 22.031122  
## iter 50 value 22.000785  
## iter 60 value 21.968689  
## iter 70 value 21.946036  
## iter 80 value 21.939365  
## iter 90 value 21.934885  
## iter 100 value 21.934698  
## final value 21.934698   
## stopped after 100 iterations  
## # weights: 127  
## initial value 114.407053   
## iter 10 value 30.075553  
## iter 20 value 23.614783  
## iter 30 value 22.489217  
## iter 40 value 22.186172  
## iter 50 value 21.946750  
## iter 60 value 21.925376  
## iter 70 value 21.923440  
## iter 80 value 21.922547  
## iter 90 value 21.922508  
## final value 21.922502   
## converged  
## # weights: 145  
## initial value 133.350932   
## iter 10 value 53.198185  
## iter 20 value 26.253976  
## iter 30 value 22.758718  
## iter 40 value 21.925595  
## iter 50 value 21.543239  
## iter 60 value 21.281815  
## iter 70 value 21.209972  
## iter 80 value 21.199876  
## iter 90 value 21.194437  
## iter 100 value 21.193873  
## final value 21.193873   
## stopped after 100 iterations  
## # weights: 163  
## initial value 136.375324   
## iter 10 value 32.873650  
## iter 20 value 23.225062  
## iter 30 value 22.044429  
## iter 40 value 21.744761  
## iter 50 value 21.638494  
## iter 60 value 21.598479  
## iter 70 value 21.594120  
## iter 80 value 21.589414  
## iter 90 value 21.579575  
## iter 100 value 21.563260  
## final value 21.563260   
## stopped after 100 iterations  
## # weights: 181  
## initial value 118.385292   
## iter 10 value 27.277758  
## iter 20 value 22.943579  
## iter 30 value 22.161673  
## iter 40 value 21.798525  
## iter 50 value 21.632744  
## iter 60 value 21.578925  
## iter 70 value 21.460166  
## iter 80 value 21.246019  
## iter 90 value 21.192637  
## iter 100 value 21.171757  
## final value 21.171757   
## stopped after 100 iterations  
## # weights: 199  
## initial value 134.897475   
## iter 10 value 31.132444  
## iter 20 value 22.971794  
## iter 30 value 22.027377  
## iter 40 value 21.525657  
## iter 50 value 21.278529  
## iter 60 value 21.157555  
## iter 70 value 21.100094  
## iter 80 value 21.084241  
## iter 90 value 21.069931  
## iter 100 value 21.060600  
## final value 21.060600   
## stopped after 100 iterations  
## # weights: 217  
## initial value 121.892100   
## iter 10 value 29.878445  
## iter 20 value 23.313378  
## iter 30 value 21.686042  
## iter 40 value 21.211312  
## iter 50 value 21.133605  
## iter 60 value 21.066495  
## iter 70 value 21.046558  
## iter 80 value 21.040925  
## iter 90 value 21.040720  
## iter 100 value 21.040679  
## final value 21.040679   
## stopped after 100 iterations  
## # weights: 235  
## initial value 146.019749   
## iter 10 value 34.024104  
## iter 20 value 23.997453  
## iter 30 value 22.110855  
## iter 40 value 21.621082  
## iter 50 value 21.323535  
## iter 60 value 21.213786  
## iter 70 value 21.164397  
## iter 80 value 21.153904  
## iter 90 value 21.146903  
## iter 100 value 21.143836  
## final value 21.143836   
## stopped after 100 iterations  
## # weights: 253  
## initial value 149.170720   
## iter 10 value 29.262848  
## iter 20 value 22.756889  
## iter 30 value 21.624415  
## iter 40 value 21.270746  
## iter 50 value 21.159408  
## iter 60 value 21.115366  
## iter 70 value 21.091680  
## iter 80 value 21.087051  
## iter 90 value 21.085566  
## iter 100 value 21.085368  
## final value 21.085368   
## stopped after 100 iterations  
## # weights: 271  
## initial value 115.405089   
## iter 10 value 34.660398  
## iter 20 value 22.758990  
## iter 30 value 22.116933  
## iter 40 value 21.763028  
## iter 50 value 21.535322  
## iter 60 value 21.437501  
## iter 70 value 21.425304  
## iter 80 value 21.422099  
## iter 90 value 21.420864  
## iter 100 value 21.420571  
## final value 21.420571   
## stopped after 100 iterations  
## # weights: 289  
## initial value 166.245818   
## iter 10 value 27.859335  
## iter 20 value 22.089095  
## iter 30 value 21.410377  
## iter 40 value 21.174965  
## iter 50 value 21.093625  
## iter 60 value 21.070824  
## iter 70 value 21.063411  
## iter 80 value 21.062737  
## iter 90 value 21.062480  
## iter 100 value 21.062316  
## final value 21.062316   
## stopped after 100 iterations  
## # weights: 307  
## initial value 154.303749   
## iter 10 value 33.112672  
## iter 20 value 23.238912  
## iter 30 value 21.732022  
## iter 40 value 21.230873  
## iter 50 value 21.130157  
## iter 60 value 21.084686  
## iter 70 value 21.070528  
## iter 80 value 21.038603  
## iter 90 value 21.020662  
## iter 100 value 21.015686  
## final value 21.015686   
## stopped after 100 iterations  
## # weights: 325  
## initial value 136.009082   
## iter 10 value 35.029760  
## iter 20 value 23.679631  
## iter 30 value 22.183823  
## iter 40 value 21.735379  
## iter 50 value 21.475469  
## iter 60 value 21.205985  
## iter 70 value 21.165428  
## iter 80 value 21.136871  
## iter 90 value 21.124826  
## iter 100 value 21.118168  
## final value 21.118168   
## stopped after 100 iterations  
## # weights: 343  
## initial value 139.347669   
## iter 10 value 26.811595  
## iter 20 value 21.699223  
## iter 30 value 21.206093  
## iter 40 value 21.110116  
## iter 50 value 21.095056  
## iter 60 value 21.064510  
## iter 70 value 21.056466  
## iter 80 value 21.052612  
## iter 90 value 21.052173  
## iter 100 value 21.052066  
## final value 21.052066   
## stopped after 100 iterations  
## # weights: 361  
## initial value 208.363397   
## iter 10 value 37.583750  
## iter 20 value 24.728207  
## iter 30 value 22.461440  
## iter 40 value 21.543538  
## iter 50 value 21.239190  
## iter 60 value 21.136967  
## iter 70 value 21.091781  
## iter 80 value 21.062899  
## iter 90 value 21.055162  
## iter 100 value 21.052753  
## final value 21.052753   
## stopped after 100 iterations  
## # weights: 19  
## initial value 113.663230   
## iter 10 value 37.211049  
## iter 20 value 26.315279  
## iter 30 value 22.031019  
## iter 40 value 16.585636  
## iter 50 value 16.351727  
## iter 60 value 16.283808  
## iter 70 value 16.277290  
## iter 80 value 16.275725  
## iter 90 value 16.275344  
## iter 100 value 16.274154  
## final value 16.274154   
## stopped after 100 iterations  
## # weights: 37  
## initial value 117.704752   
## iter 10 value 28.969411  
## iter 20 value 17.720504  
## iter 30 value 15.543495  
## iter 40 value 13.866987  
## iter 50 value 13.792049  
## iter 60 value 13.791467  
## final value 13.791466   
## converged  
## # weights: 55  
## initial value 116.987345   
## iter 10 value 25.035694  
## iter 20 value 13.556791  
## iter 30 value 6.244425  
## iter 40 value 4.253304  
## iter 50 value 4.188377  
## iter 60 value 4.187917  
## final value 4.187887   
## converged  
## # weights: 73  
## initial value 125.994534   
## iter 10 value 22.806546  
## iter 20 value 14.006771  
## iter 30 value 9.858426  
## iter 40 value 7.042704  
## iter 50 value 4.042500  
## iter 60 value 3.688856  
## iter 70 value 3.676181  
## iter 80 value 3.673157  
## iter 90 value 3.671158  
## iter 100 value 3.653519  
## final value 3.653519   
## stopped after 100 iterations  
## # weights: 91  
## initial value 113.138968   
## iter 10 value 15.047104  
## iter 20 value 5.717192  
## iter 30 value 0.594029  
## iter 40 value 0.003094  
## final value 0.000083   
## converged  
## # weights: 109  
## initial value 124.576310   
## iter 10 value 28.752813  
## iter 20 value 1.423486  
## iter 30 value 0.074017  
## iter 40 value 0.001416  
## iter 50 value 0.000260  
## final value 0.000073   
## converged  
## # weights: 127  
## initial value 135.662305   
## iter 10 value 16.406388  
## iter 20 value 0.377167  
## iter 30 value 0.003840  
## iter 40 value 0.000244  
## iter 50 value 0.000196  
## final value 0.000072   
## converged  
## # weights: 145  
## initial value 124.731449   
## iter 10 value 13.345580  
## iter 20 value 0.770057  
## iter 30 value 0.006214  
## final value 0.000099   
## converged  
## # weights: 163  
## initial value 130.083000   
## iter 10 value 14.154488  
## iter 20 value 2.233110  
## iter 30 value 0.016544  
## iter 40 value 0.000391  
## final value 0.000057   
## converged  
## # weights: 181  
## initial value 110.697561   
## iter 10 value 11.997614  
## iter 20 value 2.176914  
## iter 30 value 0.289438  
## iter 40 value 0.032866  
## iter 50 value 0.003954  
## iter 60 value 0.001495  
## iter 70 value 0.000694  
## iter 80 value 0.000463  
## iter 90 value 0.000281  
## iter 100 value 0.000197  
## final value 0.000197   
## stopped after 100 iterations  
## # weights: 199  
## initial value 104.441519   
## iter 10 value 10.443886  
## iter 20 value 0.228942  
## iter 30 value 0.007792  
## iter 40 value 0.000834  
## final value 0.000078   
## converged  
## # weights: 217  
## initial value 150.348795   
## iter 10 value 14.068406  
## iter 20 value 1.857074  
## iter 30 value 0.057998  
## iter 40 value 0.002669  
## final value 0.000090   
## converged  
## # weights: 235  
## initial value 125.414235   
## iter 10 value 13.802822  
## iter 20 value 0.910142  
## iter 30 value 0.002734  
## iter 40 value 0.000278  
## final value 0.000078   
## converged  
## # weights: 253  
## initial value 114.065611   
## iter 10 value 12.777340  
## iter 20 value 0.583569  
## iter 30 value 0.007552  
## iter 40 value 0.000315  
## final value 0.000083   
## converged  
## # weights: 271  
## initial value 147.445237   
## iter 10 value 16.116872  
## iter 20 value 0.145730  
## iter 30 value 0.001414  
## iter 40 value 0.000169  
## final value 0.000089   
## converged  
## # weights: 289  
## initial value 132.201929   
## iter 10 value 14.339013  
## iter 20 value 1.055074  
## iter 30 value 0.009005  
## iter 40 value 0.001437  
## iter 50 value 0.000270  
## iter 60 value 0.000136  
## final value 0.000090   
## converged  
## # weights: 307  
## initial value 136.986974   
## iter 10 value 14.606929  
## iter 20 value 0.250977  
## iter 30 value 0.005374  
## iter 40 value 0.000136  
## iter 40 value 0.000094  
## iter 40 value 0.000094  
## final value 0.000094   
## converged  
## # weights: 325  
## initial value 139.185219   
## iter 10 value 12.820159  
## iter 20 value 1.023006  
## iter 30 value 0.011997  
## iter 40 value 0.000995  
## iter 50 value 0.000191  
## final value 0.000087   
## converged  
## # weights: 343  
## initial value 105.593328   
## iter 10 value 12.133499  
## iter 20 value 0.474355  
## iter 30 value 0.003066  
## iter 40 value 0.000282  
## iter 50 value 0.000154  
## final value 0.000064   
## converged  
## # weights: 361  
## initial value 105.157271   
## iter 10 value 15.444541  
## iter 20 value 0.921113  
## iter 30 value 0.018167  
## iter 40 value 0.000705  
## iter 50 value 0.000336  
## final value 0.000070   
## converged  
## # weights: 19  
## initial value 116.332530   
## iter 10 value 28.788632  
## iter 20 value 26.534250  
## iter 30 value 26.526235  
## iter 30 value 26.526235  
## iter 30 value 26.526235  
## final value 26.526235   
## converged  
## # weights: 37  
## initial value 113.176113   
## iter 10 value 29.980341  
## iter 20 value 21.573436  
## iter 30 value 18.016239  
## iter 40 value 17.754236  
## iter 50 value 17.483914  
## iter 60 value 17.392682  
## iter 70 value 17.392589  
## iter 70 value 17.392589  
## iter 70 value 17.392589  
## final value 17.392589   
## converged  
## # weights: 55  
## initial value 120.243301   
## iter 10 value 28.722044  
## iter 20 value 21.790555  
## iter 30 value 17.891199  
## iter 40 value 17.246177  
## iter 50 value 17.149477  
## iter 60 value 17.148328  
## iter 70 value 17.148322  
## final value 17.148321   
## converged  
## # weights: 73  
## initial value 122.400957   
## iter 10 value 22.645049  
## iter 20 value 17.200873  
## iter 30 value 16.009164  
## iter 40 value 15.252889  
## iter 50 value 15.064854  
## iter 60 value 15.056811  
## iter 70 value 15.053948  
## iter 80 value 15.053820  
## final value 15.053820   
## converged  
## # weights: 91  
## initial value 113.875553   
## iter 10 value 27.788347  
## iter 20 value 19.913968  
## iter 30 value 16.744128  
## iter 40 value 15.782572  
## iter 50 value 15.439917  
## iter 60 value 15.309784  
## iter 70 value 15.272055  
## iter 80 value 15.235659  
## iter 90 value 15.176498  
## iter 100 value 15.160532  
## final value 15.160532   
## stopped after 100 iterations  
## # weights: 109  
## initial value 142.518858   
## iter 10 value 18.974740  
## iter 20 value 14.678585  
## iter 30 value 14.255106  
## iter 40 value 14.218355  
## iter 50 value 14.097706  
## iter 60 value 14.047550  
## iter 70 value 14.047030  
## iter 80 value 14.046940  
## final value 14.046938   
## converged  
## # weights: 127  
## initial value 127.117503   
## iter 10 value 31.526643  
## iter 20 value 17.694851  
## iter 30 value 14.954059  
## iter 40 value 14.292392  
## iter 50 value 14.216605  
## iter 60 value 14.198336  
## iter 70 value 14.196977  
## iter 80 value 14.196824  
## iter 90 value 14.196766  
## final value 14.196766   
## converged  
## # weights: 145  
## initial value 171.936637   
## iter 10 value 21.052547  
## iter 20 value 15.286493  
## iter 30 value 14.075035  
## iter 40 value 13.747534  
## iter 50 value 13.583624  
## iter 60 value 13.567280  
## iter 70 value 13.563092  
## iter 80 value 13.561297  
## iter 90 value 13.559913  
## iter 100 value 13.551133  
## final value 13.551133   
## stopped after 100 iterations  
## # weights: 163  
## initial value 126.793303   
## iter 10 value 30.603542  
## iter 20 value 17.760273  
## iter 30 value 15.361854  
## iter 40 value 14.295881  
## iter 50 value 14.016010  
## iter 60 value 13.890789  
## iter 70 value 13.782004  
## iter 80 value 13.689183  
## iter 90 value 13.635105  
## iter 100 value 13.482692  
## final value 13.482692   
## stopped after 100 iterations  
## # weights: 181  
## initial value 124.210409   
## iter 10 value 27.169038  
## iter 20 value 17.871623  
## iter 30 value 15.325889  
## iter 40 value 14.468340  
## iter 50 value 14.284187  
## iter 60 value 14.055143  
## iter 70 value 13.977180  
## iter 80 value 13.961207  
## iter 90 value 13.957725  
## iter 100 value 13.954662  
## final value 13.954662   
## stopped after 100 iterations  
## # weights: 199  
## initial value 142.477206   
## iter 10 value 23.027158  
## iter 20 value 16.764143  
## iter 30 value 15.086034  
## iter 40 value 14.426336  
## iter 50 value 14.279368  
## iter 60 value 14.102065  
## iter 70 value 13.991683  
## iter 80 value 13.950581  
## iter 90 value 13.885990  
## iter 100 value 13.840133  
## final value 13.840133   
## stopped after 100 iterations  
## # weights: 217  
## initial value 121.663873   
## iter 10 value 20.441213  
## iter 20 value 14.653262  
## iter 30 value 13.959804  
## iter 40 value 13.822706  
## iter 50 value 13.795894  
## iter 60 value 13.783767  
## iter 70 value 13.761524  
## iter 80 value 13.687751  
## iter 90 value 13.674962  
## iter 100 value 13.498817  
## final value 13.498817   
## stopped after 100 iterations  
## # weights: 235  
## initial value 142.501820   
## iter 10 value 25.462977  
## iter 20 value 16.061459  
## iter 30 value 14.505326  
## iter 40 value 13.809517  
## iter 50 value 13.691742  
## iter 60 value 13.629299  
## iter 70 value 13.467706  
## iter 80 value 13.389524  
## iter 90 value 13.349904  
## iter 100 value 13.338015  
## final value 13.338015   
## stopped after 100 iterations  
## # weights: 253  
## initial value 106.637852   
## iter 10 value 20.374056  
## iter 20 value 14.815139  
## iter 30 value 13.847987  
## iter 40 value 13.547218  
## iter 50 value 13.428975  
## iter 60 value 13.363323  
## iter 70 value 13.350910  
## iter 80 value 13.345366  
## iter 90 value 13.338562  
## iter 100 value 13.336169  
## final value 13.336169   
## stopped after 100 iterations  
## # weights: 271  
## initial value 132.817468   
## iter 10 value 25.430326  
## iter 20 value 17.094207  
## iter 30 value 14.602741  
## iter 40 value 13.960817  
## iter 50 value 13.643146  
## iter 60 value 13.539914  
## iter 70 value 13.460367  
## iter 80 value 13.418714  
## iter 90 value 13.369783  
## iter 100 value 13.338000  
## final value 13.338000   
## stopped after 100 iterations  
## # weights: 289  
## initial value 136.573829   
## iter 10 value 25.722167  
## iter 20 value 16.022759  
## iter 30 value 14.785491  
## iter 40 value 14.339914  
## iter 50 value 13.969939  
## iter 60 value 13.729319  
## iter 70 value 13.613250  
## iter 80 value 13.538071  
## iter 90 value 13.458825  
## iter 100 value 13.442952  
## final value 13.442952   
## stopped after 100 iterations  
## # weights: 307  
## initial value 120.787923   
## iter 10 value 19.585561  
## iter 20 value 14.163269  
## iter 30 value 13.745215  
## iter 40 value 13.587150  
## iter 50 value 13.450406  
## iter 60 value 13.423951  
## iter 70 value 13.413151  
## iter 80 value 13.399804  
## iter 90 value 13.376313  
## iter 100 value 13.371348  
## final value 13.371348   
## stopped after 100 iterations  
## # weights: 325  
## initial value 185.452642   
## iter 10 value 28.540148  
## iter 20 value 16.983357  
## iter 30 value 14.881189  
## iter 40 value 14.031945  
## iter 50 value 13.693242  
## iter 60 value 13.571540  
## iter 70 value 13.462509  
## iter 80 value 13.434471  
## iter 90 value 13.402107  
## iter 100 value 13.395341  
## final value 13.395341   
## stopped after 100 iterations  
## # weights: 343  
## initial value 115.912052   
## iter 10 value 20.606068  
## iter 20 value 15.012202  
## iter 30 value 13.977202  
## iter 40 value 13.588006  
## iter 50 value 13.405356  
## iter 60 value 13.365554  
## iter 70 value 13.345520  
## iter 80 value 13.336048  
## iter 90 value 13.333979  
## iter 100 value 13.331765  
## final value 13.331765   
## stopped after 100 iterations  
## # weights: 361  
## initial value 132.140712   
## iter 10 value 24.998355  
## iter 20 value 15.846716  
## iter 30 value 14.008978  
## iter 40 value 13.510979  
## iter 50 value 13.398379  
## iter 60 value 13.367292  
## iter 70 value 13.359572  
## iter 80 value 13.353579  
## iter 90 value 13.350033  
## iter 100 value 13.345732  
## final value 13.345732   
## stopped after 100 iterations  
## # weights: 19  
## initial value 116.012008   
## iter 10 value 33.462834  
## iter 20 value 30.374344  
## iter 30 value 29.712846  
## final value 29.712834   
## converged  
## # weights: 37  
## initial value 125.154017   
## iter 10 value 38.917289  
## iter 20 value 27.569504  
## iter 30 value 23.803852  
## iter 40 value 23.214152  
## iter 50 value 23.185250  
## final value 23.185100   
## converged  
## # weights: 55  
## initial value 132.295089   
## iter 10 value 47.862524  
## iter 20 value 25.770651  
## iter 30 value 22.817092  
## iter 40 value 22.185850  
## iter 50 value 22.110369  
## iter 60 value 22.109662  
## final value 22.109644   
## converged  
## # weights: 73  
## initial value 129.407556   
## iter 10 value 26.630213  
## iter 20 value 22.176028  
## iter 30 value 21.427079  
## iter 40 value 21.398444  
## iter 50 value 21.395401  
## final value 21.395366   
## converged  
## # weights: 91  
## initial value 114.640564   
## iter 10 value 27.138527  
## iter 20 value 23.032076  
## iter 30 value 21.854436  
## iter 40 value 21.620909  
## iter 50 value 21.610887  
## iter 60 value 21.610674  
## iter 70 value 21.610666  
## final value 21.610665   
## converged  
## # weights: 109  
## initial value 110.393646   
## iter 10 value 34.226160  
## iter 20 value 22.433150  
## iter 30 value 21.465286  
## iter 40 value 21.307343  
## iter 50 value 21.264250  
## iter 60 value 21.204512  
## iter 70 value 21.166451  
## iter 80 value 21.120151  
## iter 90 value 20.994273  
## iter 100 value 20.981852  
## final value 20.981852   
## stopped after 100 iterations  
## # weights: 127  
## initial value 120.360871   
## iter 10 value 35.061386  
## iter 20 value 22.531115  
## iter 30 value 21.500137  
## iter 40 value 21.137621  
## iter 50 value 20.907884  
## iter 60 value 20.784161  
## iter 70 value 20.728009  
## iter 80 value 20.708244  
## iter 90 value 20.697307  
## iter 100 value 20.694192  
## final value 20.694192   
## stopped after 100 iterations  
## # weights: 145  
## initial value 152.515143   
## iter 10 value 32.002555  
## iter 20 value 21.999050  
## iter 30 value 21.084561  
## iter 40 value 20.820090  
## iter 50 value 20.704438  
## iter 60 value 20.677573  
## iter 70 value 20.676465  
## iter 80 value 20.675381  
## iter 90 value 20.666052  
## iter 100 value 20.661725  
## final value 20.661725   
## stopped after 100 iterations  
## # weights: 163  
## initial value 121.572876   
## iter 10 value 25.265361  
## iter 20 value 21.584190  
## iter 30 value 20.734662  
## iter 40 value 20.542082  
## iter 50 value 20.473962  
## iter 60 value 20.395319  
## iter 70 value 20.375092  
## iter 80 value 20.353190  
## iter 90 value 20.341610  
## iter 100 value 20.340937  
## final value 20.340937   
## stopped after 100 iterations  
## # weights: 181  
## initial value 146.184112   
## iter 10 value 23.735876  
## iter 20 value 21.334413  
## iter 30 value 20.874398  
## iter 40 value 20.756127  
## iter 50 value 20.698789  
## iter 60 value 20.664703  
## iter 70 value 20.635875  
## iter 80 value 20.558321  
## iter 90 value 20.435606  
## iter 100 value 20.398084  
## final value 20.398084   
## stopped after 100 iterations  
## # weights: 199  
## initial value 123.720921   
## iter 10 value 25.212282  
## iter 20 value 21.255568  
## iter 30 value 20.969441  
## iter 40 value 20.789055  
## iter 50 value 20.621996  
## iter 60 value 20.517062  
## iter 70 value 20.507918  
## iter 80 value 20.506130  
## iter 90 value 20.505655  
## iter 100 value 20.505479  
## final value 20.505479   
## stopped after 100 iterations  
## # weights: 217  
## initial value 123.009037   
## iter 10 value 25.928406  
## iter 20 value 21.482541  
## iter 30 value 21.080540  
## iter 40 value 20.831572  
## iter 50 value 20.719035  
## iter 60 value 20.615910  
## iter 70 value 20.589133  
## iter 80 value 20.416513  
## iter 90 value 20.385217  
## iter 100 value 20.350211  
## final value 20.350211   
## stopped after 100 iterations  
## # weights: 235  
## initial value 97.299270   
## iter 10 value 25.272822  
## iter 20 value 21.406095  
## iter 30 value 20.569186  
## iter 40 value 20.384348  
## iter 50 value 20.344076  
## iter 60 value 20.316404  
## iter 70 value 20.308032  
## iter 80 value 20.306247  
## iter 90 value 20.306000  
## final value 20.305991   
## converged  
## # weights: 253  
## initial value 101.617786   
## iter 10 value 25.409083  
## iter 20 value 21.365594  
## iter 30 value 20.682871  
## iter 40 value 20.406320  
## iter 50 value 20.351831  
## iter 60 value 20.342763  
## iter 70 value 20.337760  
## iter 80 value 20.334850  
## iter 90 value 20.333954  
## iter 100 value 20.333746  
## final value 20.333746   
## stopped after 100 iterations  
## # weights: 271  
## initial value 230.737434   
## iter 10 value 28.253434  
## iter 20 value 21.845382  
## iter 30 value 20.950909  
## iter 40 value 20.657074  
## iter 50 value 20.554425  
## iter 60 value 20.531913  
## iter 70 value 20.524139  
## iter 80 value 20.512218  
## iter 90 value 20.505586  
## iter 100 value 20.503462  
## final value 20.503462   
## stopped after 100 iterations  
## # weights: 289  
## initial value 146.400112   
## iter 10 value 35.264466  
## iter 20 value 22.474562  
## iter 30 value 21.113570  
## iter 40 value 20.711442  
## iter 50 value 20.586025  
## iter 60 value 20.497682  
## iter 70 value 20.484124  
## iter 80 value 20.477744  
## iter 90 value 20.474637  
## iter 100 value 20.473803  
## final value 20.473803   
## stopped after 100 iterations  
## # weights: 307  
## initial value 113.823135   
## iter 10 value 25.503349  
## iter 20 value 21.484103  
## iter 30 value 21.005238  
## iter 40 value 20.640665  
## iter 50 value 20.509858  
## iter 60 value 20.437525  
## iter 70 value 20.430487  
## iter 80 value 20.421757  
## iter 90 value 20.418426  
## iter 100 value 20.415853  
## final value 20.415853   
## stopped after 100 iterations  
## # weights: 325  
## initial value 105.771636   
## iter 10 value 34.396553  
## iter 20 value 22.591273  
## iter 30 value 20.928339  
## iter 40 value 20.751473  
## iter 50 value 20.555043  
## iter 60 value 20.471796  
## iter 70 value 20.422279  
## iter 80 value 20.416766  
## iter 90 value 20.413583  
## iter 100 value 20.411009  
## final value 20.411009   
## stopped after 100 iterations  
## # weights: 343  
## initial value 141.455194   
## iter 10 value 27.036617  
## iter 20 value 21.577591  
## iter 30 value 20.899087  
## iter 40 value 20.527709  
## iter 50 value 20.371873  
## iter 60 value 20.317589  
## iter 70 value 20.297266  
## iter 80 value 20.293464  
## iter 90 value 20.290505  
## iter 100 value 20.289735  
## final value 20.289735   
## stopped after 100 iterations  
## # weights: 361  
## initial value 144.817636   
## iter 10 value 25.265345  
## iter 20 value 21.370970  
## iter 30 value 20.586219  
## iter 40 value 20.314849  
## iter 50 value 20.268045  
## iter 60 value 20.258092  
## iter 70 value 20.252836  
## iter 80 value 20.246937  
## iter 90 value 20.246326  
## iter 100 value 20.246191  
## final value 20.246191   
## stopped after 100 iterations  
## # weights: 37  
## initial value 131.246102   
## iter 10 value 43.381262  
## iter 20 value 28.019882  
## iter 30 value 25.325432  
## iter 40 value 24.913606  
## iter 50 value 24.895074  
## final value 24.895071   
## converged

modeloPM

## Neural Network   
##   
## 185 samples  
## 16 predictor  
## 2 classes: 'Perdido', 'Ganado'   
##   
## Pre-processing: centered (16), scaled (16)   
## Resampling: Cross-Validated (10 fold)   
## Summary of sample sizes: 166, 165, 167, 167, 167, 166, ...   
## Resampling results across tuning parameters:  
##   
## size decay Accuracy Kappa   
## 1 0.00 0.8864912 0.7730681  
## 1 0.05 0.9189766 0.8378912  
## 1 0.10 0.9026023 0.8050551  
## 2 0.00 0.8920468 0.7839440  
## 2 0.05 0.9192690 0.8383884  
## 2 0.10 0.9300877 0.8602320  
## 3 0.00 0.8984503 0.7968987  
## 3 0.05 0.9031579 0.8061662  
## 3 0.10 0.9139766 0.8278912  
## 4 0.00 0.8812573 0.7619798  
## 4 0.05 0.9139766 0.8278912  
## 4 0.10 0.9195322 0.8390023  
## 5 0.00 0.8490351 0.6981200  
## 5 0.05 0.8973099 0.7945578  
## 5 0.10 0.9031579 0.8061662  
## 6 0.00 0.9026023 0.8052832  
## 6 0.05 0.9084211 0.8167801  
## 6 0.10 0.8976023 0.7950551  
## 7 0.00 0.8765205 0.7529527  
## 7 0.05 0.9031579 0.8061662  
## 7 0.10 0.9195322 0.8390023  
## 8 0.00 0.8745614 0.7487591  
## 8 0.05 0.9084211 0.8167801  
## 8 0.10 0.9195322 0.8390023  
## 9 0.00 0.8973392 0.7946764  
## 9 0.05 0.9084211 0.8167801  
## 9 0.10 0.9195322 0.8390023  
## 10 0.00 0.8820760 0.7638260  
## 10 0.05 0.9031579 0.8061662  
## 10 0.10 0.9139766 0.8278912  
## 11 0.00 0.8768129 0.7542493  
## 11 0.05 0.9084211 0.8167801  
## 11 0.10 0.9195322 0.8390023  
## 12 0.00 0.8595906 0.7187690  
## 12 0.05 0.8973099 0.7945578  
## 12 0.10 0.9195322 0.8390023  
## 13 0.00 0.8698246 0.7393679  
## 13 0.05 0.9250877 0.8501134  
## 13 0.10 0.9139766 0.8278912  
## 14 0.00 0.8817836 0.7635614  
## 14 0.05 0.9195322 0.8390023  
## 14 0.10 0.9139766 0.8278912  
## 15 0.00 0.8703801 0.7406106  
## 15 0.05 0.9028655 0.8056690  
## 15 0.10 0.9139766 0.8278912  
## 16 0.00 0.8973392 0.7946764  
## 16 0.05 0.9084211 0.8167801  
## 16 0.10 0.9195322 0.8390023  
## 17 0.00 0.8926316 0.7854017  
## 17 0.05 0.9028655 0.8056690  
## 17 0.10 0.9195322 0.8390023  
## 18 0.00 0.8859357 0.7717217  
## 18 0.05 0.9139766 0.8278912  
## 18 0.10 0.9195322 0.8390023  
## 19 0.00 0.8867836 0.7733288  
## 19 0.05 0.8976023 0.7952903  
## 19 0.10 0.9139766 0.8278912  
## 20 0.00 0.8926023 0.7849391  
## 20 0.05 0.9084211 0.8167801  
## 20 0.10 0.9139766 0.8278912  
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final values used for the model were size = 2 and decay = 0.1.

modeloPM$finalModel

## a 16-2-1 network with 37 weights  
## inputs: `\`Sets jugados\`` BP G `\`Saque-Tot\`` `\`Saque-Pts\`` `\`Saque-Err\`` `\`Recep-Tot\`` `\`Recep-Err\`` `\`Recep-Neg\`` `\`Recep-Exc\`` `\`Ataque-Tot\`` `\`Ataque-Err\`` `\`Ataque-Blo\`` `\`Ataque-Exc\`` `\`Bloqueo-Red\`` `\`Bloqueo-Pts\``   
## output(s): .outcome   
## options were - entropy fitting decay=0.1

summary(modeloPM)

## a 16-2-1 network with 37 weights  
## options were - entropy fitting decay=0.1  
## b->h1 i1->h1 i2->h1 i3->h1 i4->h1 i5->h1 i6->h1 i7->h1 i8->h1 i9->h1   
## 0.36 0.34 1.98 0.56 1.05 0.03 0.71 -3.05 -0.54 -1.55   
## i10->h1 i11->h1 i12->h1 i13->h1 i14->h1 i15->h1 i16->h1   
## 0.26 -0.13 -0.75 -1.40 1.87 -0.01 -0.21   
## b->h2 i1->h2 i2->h2 i3->h2 i4->h2 i5->h2 i6->h2 i7->h2 i8->h2 i9->h2   
## 0.41 0.34 -1.47 -0.39 -1.21 0.22 0.84 2.74 0.19 -0.93   
## i10->h2 i11->h2 i12->h2 i13->h2 i14->h2 i15->h2 i16->h2   
## 0.62 -0.72 0.59 0.60 -1.43 -0.15 0.13   
## b->o h1->o h2->o   
## -0.59 5.59 -5.26

# modeloPM$results

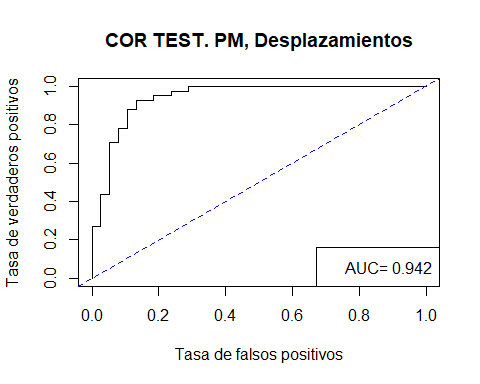
preditestPM= predict(modeloPM,dattest[,-18])  
confutestPM=table(RealPM\_test=dattest[,18]$`Ganado/Perdido`,  
 PredPM\_test=preditestPM)  
confutestPM

## PredPM\_test  
## RealPM\_test Perdido Ganado  
## Perdido 38 3  
## Ganado 5 33

AciertoPM=round(100\*mean(dattest$`Ganado/Perdido`==preditestPM),2)  
SensEspecPM=round(100\*diag(prop.table(confutestPM,1)),2)  
c(AciertoPM, SensEspecPM)

## Perdido Ganado   
## 89.87 92.68 86.84

probabiPM= predict(modeloPM,newdata = dat[inditest,2:17] ,   
 type="prob")[,1] #Prob. ganar  
prediobjPM=prediction(probabiPM,dat[inditest,18])  
plot(performance(prediobjPM, "tpr","fpr"),  
 main="COR TEST. PM, Desplazamientos",  
 xlab="Tasa de falsos positivos",   
 ylab="Tasa de verdaderos positivos")  
abline(a=0,b=1,col="blue",lty=2)  
aucPM= as.numeric(performance(prediobjPM,"auc")@y.values)  
legend("bottomright",legend=paste("AUC=",round(aucPM,3)))



Resul=rbind(Resul,c(AciertoPM,aucPM,SensEspecPM))  
rownames(Resul)=c("Gauss","Kernel(Poisson)","LDA","R.Logistica","Perceptron Multicapas")  
Resul

## Acierto AUC 0 1  
## Gauss 84.81 0.10590501 85.37 84.21  
## Kernel(Poisson) 81.01 0.08857510 78.05 84.21  
## LDA 88.61 0.05455712 87.80 89.47  
## R.Logistica 87.34 0.94030809 90.24 84.21  
## Perceptron Multicapas 89.87 0.94159178 92.68 86.84

### Vectores soporte

Vamos a ver si la muestra está balanceada

table(datent$`Ganado/Perdido`) # datos no balanceados

##   
## Perdido Ganado   
## 92 93

Vamos a hacerlo con la librería caret.

#Definir opciones para train  
ctrl <- trainControl(method="cv",classProbs=TRUE,  
 summaryFunction = twoClassSummary)  
  
modeloSVM <- train(`Ganado/Perdido` ~ ., data = datent[,2:18],   
 method = "svmRadial",   
 trControl = ctrl,   
 preProcess = "range",   
 rangeBounds =c(0,1),  
 tuneGrid = expand.grid(C=c(0.1,1,5,10,50),  
 sigma=c(0.025,0.035,0.5)) )

## Warning in train.default(x, y, weights = w, ...): The metric "Accuracy" was not  
## in the result set. ROC will be used instead.

modeloSVM

## Support Vector Machines with Radial Basis Function Kernel   
##   
## 185 samples  
## 16 predictor  
## 2 classes: 'Perdido', 'Ganado'   
##   
## Pre-processing: re-scaling to [0, 1] (16)   
## Resampling: Cross-Validated (10 fold)   
## Summary of sample sizes: 166, 167, 166, 167, 166, 166, ...   
## Resampling results across tuning parameters:  
##   
## C sigma ROC Sens Spec   
## 0.1 0.025 0.9603704 0.8788889 0.9133333  
## 0.1 0.035 0.9616049 0.8566667 0.9144444  
## 0.1 0.500 0.9291358 0.4777778 0.7444444  
## 1.0 0.025 0.9703704 0.8788889 0.9133333  
## 1.0 0.035 0.9656790 0.8788889 0.9033333  
## 1.0 0.500 0.9175309 0.8688889 0.8611111  
## 5.0 0.025 0.9681481 0.8900000 0.9022222  
## 5.0 0.035 0.9625926 0.8688889 0.8822222  
## 5.0 0.500 0.9183951 0.8677778 0.8288889  
## 10.0 0.025 0.9639506 0.9111111 0.8933333  
## 10.0 0.035 0.9582716 0.8800000 0.8933333  
## 10.0 0.500 0.9183951 0.8677778 0.8400000  
## 50.0 0.025 0.9403704 0.8788889 0.8822222  
## 50.0 0.035 0.9379012 0.8788889 0.8611111  
## 50.0 0.500 0.9183951 0.8677778 0.8400000  
##   
## ROC was used to select the optimal model using the largest value.  
## The final values used for the model were sigma = 0.025 and C = 1.

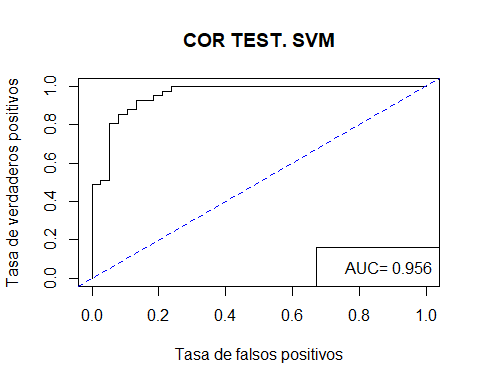
predictestSVM<- predict(modeloSVM,dattest[,2:17])  
confutestSVM<-table(Real=dattest$`Ganado/Perdido`,  
 Pred=predictestSVM)  
confutestSVM

## Pred  
## Real Perdido Ganado  
## Perdido 38 3  
## Ganado 7 31

AciertoSVM=round(100\*mean(dattest$`Ganado/Perdido`==predictestSVM),2)  
SensEspecSVM=round(100\*diag(prop.table(confutestSVM,1)),2)  
c(AciertoSVM, SensEspecSVM)

## Perdido Ganado   
## 87.34 92.68 81.58

probabiSVM= predict(modeloSVM,newdata = dat[inditest,2:17] ,   
 type="prob")[,1] #Prob. ganar  
prediobjSVM=prediction(probabiSVM,dat[inditest,18])  
plot(performance(prediobjSVM, "tpr","fpr"),  
 main="COR TEST. SVM",  
 xlab="Tasa de falsos positivos",   
 ylab="Tasa de verdaderos positivos")  
abline(a=0,b=1,col="blue",lty=2)  
aucSVM= as.numeric(performance(prediobjSVM,"auc")@y.values)  
legend("bottomright",legend=paste("AUC=",round(aucSVM,3)))



Resul=rbind(Resul,c(AciertoSVM,aucSVM,SensEspecSVM))  
rownames(Resul)=c("Gauss","Kernel(Poisson)","LDA","R.Logistica","Perceptron Multicapas", "Vectores soporte")  
Resul

## Acierto AUC 0 1  
## Gauss 84.81 0.10590501 85.37 84.21  
## Kernel(Poisson) 81.01 0.08857510 78.05 84.21  
## LDA 88.61 0.05455712 87.80 89.47  
## R.Logistica 87.34 0.94030809 90.24 84.21  
## Perceptron Multicapas 89.87 0.94159178 92.68 86.84  
## Vectores soporte 87.34 0.95571245 92.68 81.58

Vamos a utilizar la técnica UPSAMPLE: se muestrea con reemplazamiento en la clase minoritaria para igualar el número de casos de la clase mayoritaria. Comparamos los dos modelos puesto que las muestras no son balanceadas por un registro.

upSampled\_train = upSample(datent[, 2:17],   
 datent$`Ganado/Perdido`)  
dim(upSampled\_train)

## [1] 186 17

table(upSampled\_train$Class)

##   
## Perdido Ganado   
## 93 93

names(upSampled\_train)[17]= "Ganado/Perdido"

ctrl5 = trainControl(method = "cv",  
 number=5,  
 classProbs = TRUE,  
 summaryFunction = twoClassSummary)  
  
SVMUp=train(`Ganado/Perdido` ~ .,   
 data = upSampled\_train,  
 method = "svmRadial",   
 preProcess = "range",   
 rangeBounds =c(0,1),  
 tuneLength=10,  
 trControl = ctrl5,  
 tuneGrid = expand.grid(C=c(0.1,1,5,10,50),  
 sigma=c(0.025,0.035,0.05)),  
 metric="Sens")  
SVMUp

## Support Vector Machines with Radial Basis Function Kernel   
##   
## 186 samples  
## 16 predictor  
## 2 classes: 'Perdido', 'Ganado'   
##   
## Pre-processing: re-scaling to [0, 1] (16)   
## Resampling: Cross-Validated (5 fold)   
## Summary of sample sizes: 150, 149, 148, 148, 149   
## Resampling results across tuning parameters:  
##   
## C sigma ROC Sens Spec   
## 0.1 0.025 0.9617250 0.8286550 0.9573099  
## 0.1 0.035 0.9646182 0.8286550 0.9350877  
## 0.1 0.050 0.9651106 0.8602339 0.8602339  
## 1.0 0.025 0.9724685 0.8497076 0.9140351  
## 1.0 0.035 0.9690828 0.8602339 0.8923977  
## 1.0 0.050 0.9666803 0.8824561 0.8818713  
## 5.0 0.025 0.9695103 0.8707602 0.8923977  
## 5.0 0.035 0.9649208 0.8602339 0.8923977  
## 5.0 0.050 0.9520109 0.8397661 0.8923977  
## 10.0 0.025 0.9660289 0.8923977 0.9140351  
## 10.0 0.035 0.9552204 0.8491228 0.9140351  
## 10.0 0.050 0.9401611 0.8187135 0.8923977  
## 50.0 0.025 0.9450669 0.8508772 0.8929825  
## 50.0 0.035 0.9411870 0.8403509 0.8719298  
## 50.0 0.050 0.9335146 0.8298246 0.9035088  
##   
## Sens was used to select the optimal model using the largest value.  
## The final values used for the model were sigma = 0.025 and C = 10.

Evaluamos el modelo

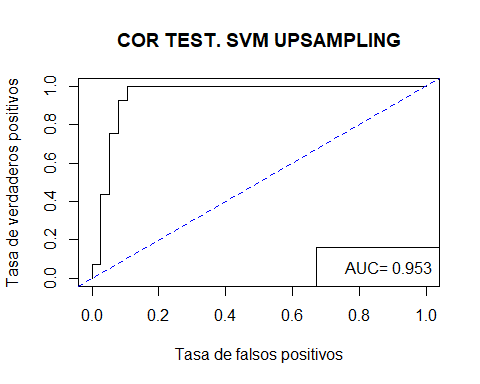
predictestUp = predict(SVMUp, dattest[,2:17])  
  
confutestSVM\_up<-table(Real=dattest$`Ganado/Perdido`,  
 Pred=predictestUp)  
confutestSVM\_up

## Pred  
## Real Perdido Ganado  
## Perdido 39 2  
## Ganado 4 34

AciertoSVM\_up=round(100\*mean(dattest$`Ganado/Perdido`==predictestUp),2)  
SensEspecSVM\_up=round(100\*diag(prop.table(confutestSVM\_up,1)),2)  
c(AciertoSVM\_up, SensEspecSVM\_up)

## Perdido Ganado   
## 92.41 95.12 89.47

probabiSVM\_up= predict(SVMUp,newdata = dat[inditest,2:17] ,   
 type="prob")[,1] #Prob. ganar  
prediobjSVM\_up = prediction(probabiSVM\_up,dat[inditest,18])  
plot(performance(prediobjSVM\_up, "tpr","fpr"),  
 main="COR TEST. SVM UPSAMPLING",  
 xlab="Tasa de falsos positivos",   
 ylab="Tasa de verdaderos positivos")  
abline(a=0,b=1,col="blue",lty=2)  
aucSVM\_up = as.numeric(performance(prediobjSVM\_up,"auc")@y.values)  
legend("bottomright",legend=paste("AUC=",round(aucSVM\_up,3)))



Resul=rbind(Resul,c(AciertoSVM\_up,aucSVM\_up,SensEspecSVM\_up))  
rownames(Resul)=c("Gauss","Kernel(Poisson)","LDA","R.Logistica","Perceptron Multicapas", "Vectores soporte","Vectores soporte con Upsampling")  
Resul

## Acierto AUC 0 1  
## Gauss 84.81 0.10590501 85.37 84.21  
## Kernel(Poisson) 81.01 0.08857510 78.05 84.21  
## LDA 88.61 0.05455712 87.80 89.47  
## R.Logistica 87.34 0.94030809 90.24 84.21  
## Perceptron Multicapas 89.87 0.94159178 92.68 86.84  
## Vectores soporte 87.34 0.95571245 92.68 81.58  
## Vectores soporte con Upsampling 92.41 0.95250321 95.12 89.47

### Árbol de clasificación

library(rpart)   
library(graphics)  
modeloAB <- rpart(`Ganado/Perdido` ~ .,   
 data=datent[,2:18],method="class")  
modeloAB

## n= 185   
##   
## node), split, n, loss, yval, (yprob)  
## \* denotes terminal node  
##   
## 1) root 185 92 Ganado (0.49729730 0.50270270)   
## 2) BP< 22.5 70 6 Perdido (0.91428571 0.08571429) \*  
## 3) BP>=22.5 115 28 Ganado (0.24347826 0.75652174)   
## 6) Recep-Tot>=80.5 51 25 Perdido (0.50980392 0.49019608)   
## 12) Ataque-Exc< 58.5 22 4 Perdido (0.81818182 0.18181818) \*  
## 13) Ataque-Exc>=58.5 29 8 Ganado (0.27586207 0.72413793) \*  
## 7) Recep-Tot< 80.5 64 2 Ganado (0.03125000 0.96875000) \*

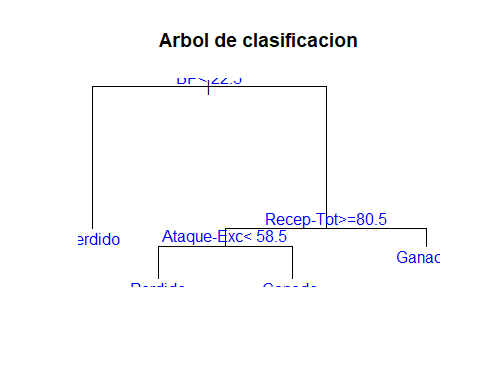
# summary(modeloAB)  
modeloAB$parms #probabilidades a priori, costes

## $prior  
## 1 2   
## 0.4972973 0.5027027   
##   
## $loss  
## [,1] [,2]  
## [1,] 0 1  
## [2,] 1 0  
##   
## $split  
## [1] 1

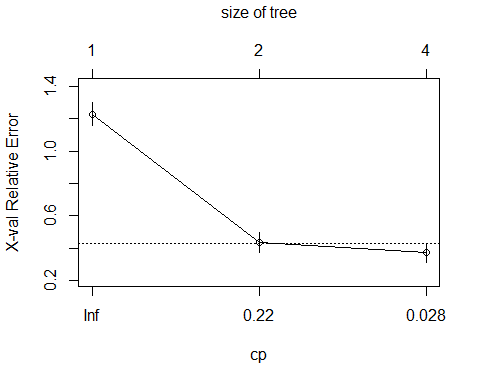
modeloAB$variable.importance

## BP Saque-Tot Ataque-Exc G Saque-Pts Recep-Tot   
## 39.160651 33.574644 24.701109 19.053283 16.783136 13.000021   
## Ataque-Tot Bloqueo-Pts Sets jugados Recep-Exc   
## 12.266372 11.517317 10.339075 7.392169

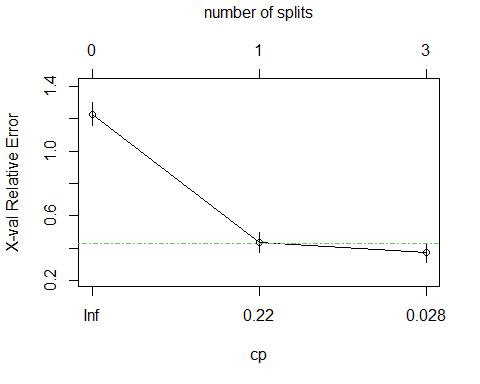
plot(modeloAB,main="Arbol de clasificacion",compress=TRUE)  
text(modeloAB,col="blue")



plotcp(modeloAB) # tamaños



plotcp(modeloAB,upper = c("splits"),lty = 10,col=3) # numero de divisiones



printcp(modeloAB)

##   
## Classification tree:  
## rpart(formula = `Ganado/Perdido` ~ ., data = datent[, 2:18],   
## method = "class")  
##   
## Variables actually used in tree construction:  
## [1] Ataque-Exc BP Recep-Tot   
##   
## Root node error: 92/185 = 0.4973  
##   
## n= 185   
##   
## CP nsplit rel error xerror xstd  
## 1 0.630435 0 1.00000 1.22826 0.072083  
## 2 0.076087 1 0.36957 0.43478 0.060861  
## 3 0.010000 3 0.21739 0.36957 0.057260

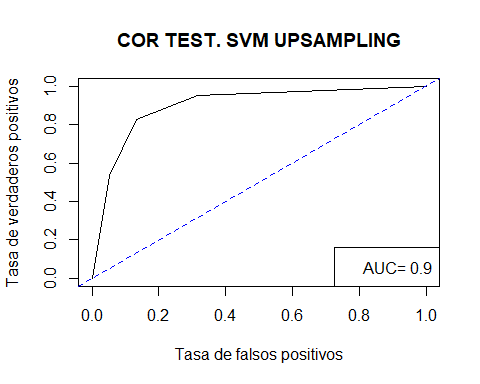
predictestAB <- predict(modeloAB,type="class", dattest[,2:17])  
confutestAB<-table(dattest$`Ganado/Perdido`,predictestAB,deparse.level = 2)  
confutestAB

## predictestAB  
## dattest$`Ganado/Perdido` Perdido Ganado  
## Perdido 34 7  
## Ganado 5 33

AciertoAB=round(100\*mean(dattest$`Ganado/Perdido`==predictestAB),2)  
SensEspecAB=round(100\*diag(prop.table(confutestAB,1)),2)  
c(AciertoAB, SensEspecAB)

## Perdido Ganado   
## 84.81 82.93 86.84

probabiAB= predict(modeloAB,newdata = dat[inditest,2:17] ,   
 type="prob")[,1]   
prediobjAB = prediction(probabiAB,dat[inditest,18])  
plot(performance(prediobjAB, "tpr","fpr"),  
 main="COR TEST. SVM UPSAMPLING",  
 xlab="Tasa de falsos positivos",   
 ylab="Tasa de verdaderos positivos")  
abline(a=0,b=1,col="blue",lty=2)  
aucAB = as.numeric(performance(prediobjAB,"auc")@y.values)  
legend("bottomright",legend=paste("AUC=",round(aucAB,3)))



# Conclusiones

Resul=rbind(Resul,c(AciertoAB,aucAB,SensEspecAB))  
rownames(Resul)=c("Gauss","Kernel(Poisson)","LDA","R.Logistica","Perceptron Multicapas", "Vectores soporte","Vectores soporte con Upsampling", "Arbol de clasificacion")  
Resul

## Acierto AUC 0 1  
## Gauss 84.81 0.10590501 85.37 84.21  
## Kernel(Poisson) 81.01 0.08857510 78.05 84.21  
## LDA 88.61 0.05455712 87.80 89.47  
## R.Logistica 87.34 0.94030809 90.24 84.21  
## Perceptron Multicapas 89.87 0.94159178 92.68 86.84  
## Vectores soporte 87.34 0.95571245 92.68 81.58  
## Vectores soporte con Upsampling 92.41 0.95250321 95.12 89.47  
## Arbol de clasificacion 84.81 0.89955071 82.93 86.84

library(pROC)

## Type 'citation("pROC")' for a citation.

##   
## Attaching package: 'pROC'

## The following objects are masked from 'package:stats':  
##   
## cov, smooth, var

ROCtestNB1 = roc(dattest$`Ganado/Perdido`, probabi1)

## Setting levels: control = Perdido, case = Ganado

## Setting direction: controls > cases

ROCtestNB2 = roc(dattest$`Ganado/Perdido`, probabi2)

## Setting levels: control = Perdido, case = Ganado  
## Setting direction: controls > cases

ROCtestLDA = roc(dattest$`Ganado/Perdido`, probabiLDA)

## Setting levels: control = Perdido, case = Ganado  
## Setting direction: controls > cases

ROCtestPM = roc(dattest$`Ganado/Perdido`, probabiPM)

## Setting levels: control = Perdido, case = Ganado  
## Setting direction: controls > cases

ROCtestSVM = roc(dattest$`Ganado/Perdido`, probabiSVM)

## Setting levels: control = Perdido, case = Ganado  
## Setting direction: controls > cases

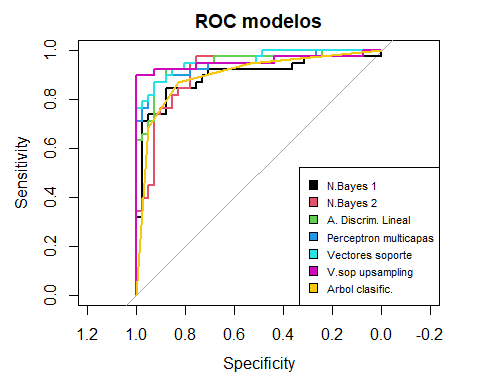
ROCtestUp = roc(dattest$`Ganado/Perdido`, probabiSVM\_up)

## Setting levels: control = Perdido, case = Ganado  
## Setting direction: controls > cases

ROCtestAB = roc(dattest$`Ganado/Perdido`, probabiAB)

## Setting levels: control = Perdido, case = Ganado  
## Setting direction: controls > cases

plot(ROCtestNB1,col=1,lwd=2,main="ROC modelos")  
lines(ROCtestNB2,col=2,lwd=2)  
lines(ROCtestLDA,col=3,lwd=2)  
lines(ROCtestPM,col=4,lwd=2)  
lines(ROCtestSVM,col=5,lwd=2)  
lines(ROCtestUp,col=6,lwd=2)  
lines(ROCtestAB,col=7,lwd=2)  
legend(x = "bottomright", legend = c("N.Bayes 1", "N.Bayes 2", "A. Discrim. Lineal", "Perceptron multicapas", "Vectores soporte", "V.sop upsampling", "Arbol clasific."), fill = 1:7, cex=0.7)



# OBSERVACIONES

Variables que son combinacion de otras:

* Tot = Saque\_Pts + Ataque-Exc + Bloqueo-Pts

partidos2021["Tot"] -partidos2021["Saque-Pts"] - partidos2021["Bloqueo-Pts"] -partidos2021["Ataque-Exc"]

## Tot  
## 1 0  
## 2 0  
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## 262 0  
## 263 0  
## 264 0

* G-P = Tot - (Saque-Err + Ataque-Err + Ataque-Blo + Recep-Err)

partidos2021["G-P"] -(partidos2021["Tot"] -partidos2021["Saque-Err"] - partidos2021["Ataque-Err"] -partidos2021["Ataque-Blo"] - partidos2021["Recep-Err"])

## G-P  
## 1 0  
## 2 0  
## 3 0  
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