Datos Capitulo 3

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20/4/2022

Datos de la Liga Iberdrola 2018/2019 (https://rfevb-web.dataproject.com/Statistics.aspx?ID=49&PID=80&mn=23)

Liga 2018/2019

```
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 Ju
##  $ 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 Ju
##  $ 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.:51.75   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-ExcPorc
  - Recep-Efic
  - Ataque-ExcPorc
  - Ataque-Efic
  - Bloqueo-Pts por set
- Variables cualitativas discretas
  - Equipo
  - Ganado/Perdido

VARIABLES: sets jugados, BP, G, G-P, Saque-pto,saque-error,recep-error,recep-neg,recep-exc, ataque-err, ataque-bloq, ataque-exc, bloqueo-ptos, equipo, ganado/perdido

```
dat = partidos2021[,c(1:9,12:15,18:21,24:25,27)]
levels(dat$`Ganado/Perdido`)=c("Perdido","Ganado")
```

Gráficos y análisis de las variables

```
library(ggplot2)
library(dplyr)
```

Boxplot

```
##
## 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()
```

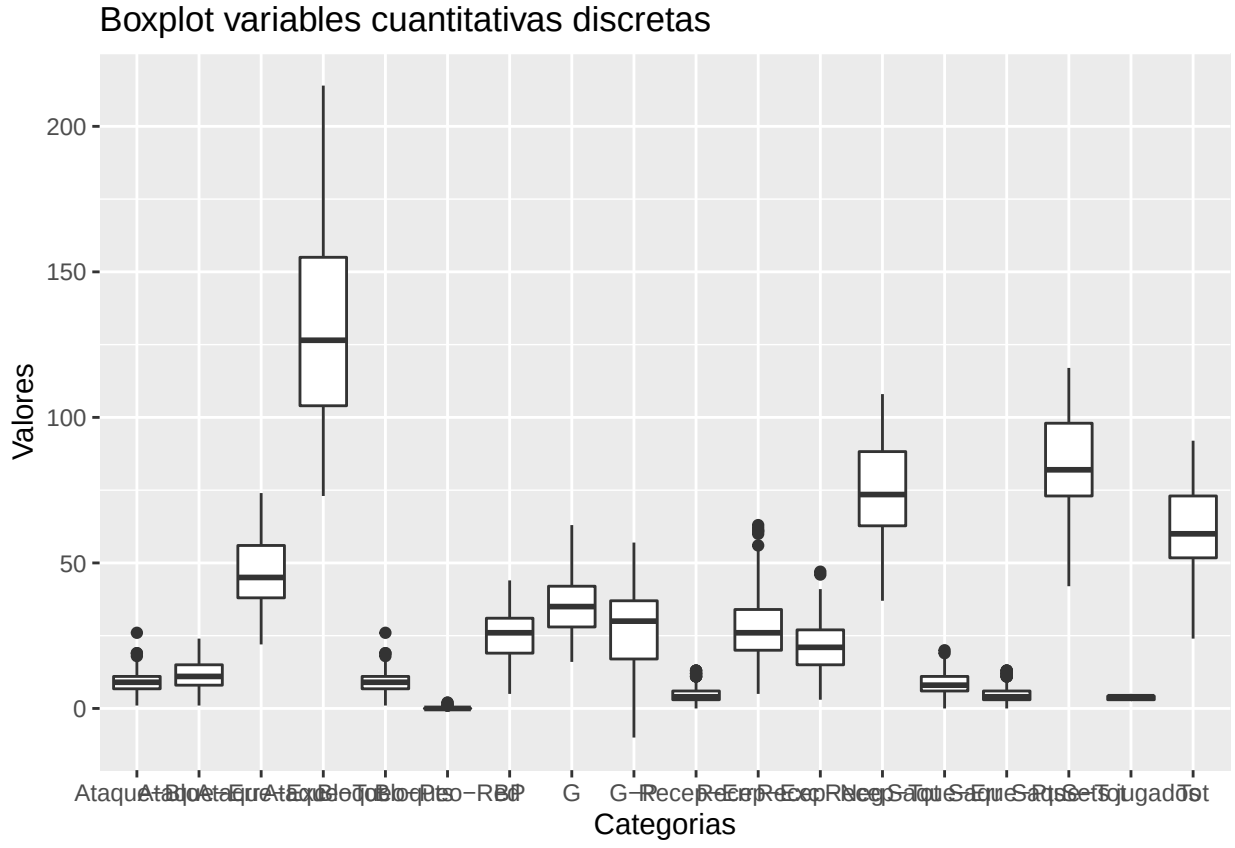
```
# boxplot(partidos2021[,-1])

# CAMBIAMOS A FORMATO LARGO PARA HACER BOXPLOT DE LAS VARIABLES, dividimos en 2 grupos para hacer boxpl
# variables cuantitativas discretas
partidos_boxplot1 = partidos2021[,c(2:9,12:15,18:21,24,25)] %>%
  pivot_longer(names_to = "Variables cuant discretas",
               values_to = "Valores", cols=everything())
head(partidos_boxplot1)
```

```
## # A tibble: 6 x 2
##   `Variables cuant discretas` Valores
##   <chr>                         <dbl>
## 1 Sets jugados                      5
## 2 Tot                              71
## 3 BP                               27
## 4 G                                44
## 5 G-P                              30
## 6 Saque-Tot                       107
```

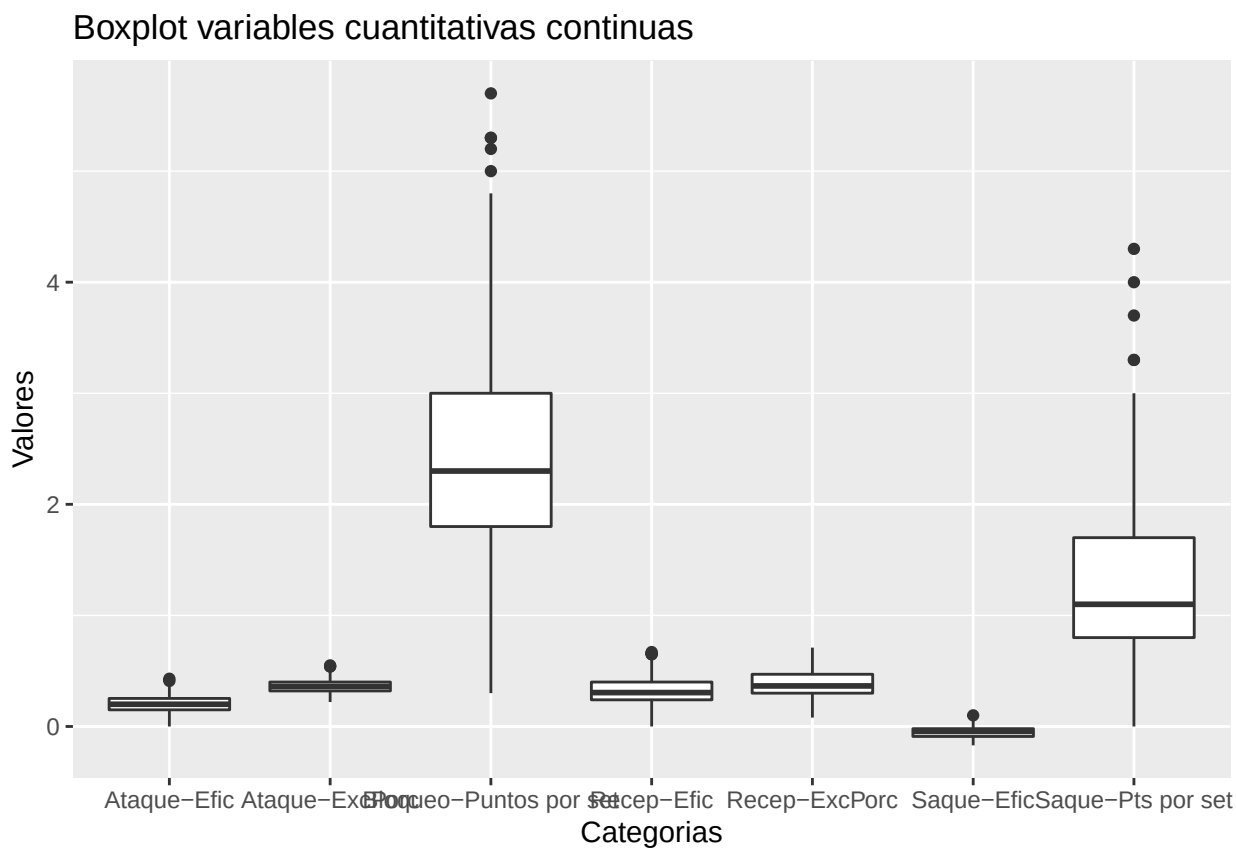
```
# variables cuantitativas continuas
partidos_boxplot2 = partidos2021[,-c(1,27,2:9,12:15,18:21,24,25)] %>%
  pivot_longer(names_to = "Variables cuant continuas", values_to = "Valores", cols=everything())
```

```
partidos_boxplot1 %>%
  ggplot(aes(x=`Variables cuant discretas` , y=Valores)) +
  geom_boxplot() +
  labs(
    title="Boxplot variables cuantitativas discretas",
    x="Categorias",
    y="Valores")
```



Variables cuantitativas continuas

```
partidos_boxplot2 %>%
  ggplot(aes(x=`Variables cuant continuas` , y=Valores)) +
  geom_boxplot() +
  labs(
    title="Boxplot variables cuantitativas continuas",
    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(partidos2021[2:27]) # hasta 26
```

```
##                       Sets jugados         Tot          BP           G
## Sets jugados           0.6512270999   9.3895610   3.27341860   6.11614241
## Tot                    9.3895610093 212.5233178  96.03348600 116.48983178
## BP                     3.2734185966  96.0334860  65.66250432  30.37098168
## G                      6.1161424127 116.4898318  30.37098168  86.11885010
## G-P                    4.5433805738 159.8034480  90.50470964  69.29873833
## Saque-Tot             12.9989630142 254.5527711 113.15053578 141.40223528
## Saque-Pts              0.5437262357  17.8583650  14.01615970   3.84220532
```

```
## Saque-Err               1.3148980297  21.9587654   6.62016073  15.33860468
## Saque-Pts por set      -0.0685101970   1.8952904   2.83174041  -0.93645005
## Saque-Efic             -0.0013307985   0.1248669   0.16973384  -0.04486692
## Recep-Tot              11.7020394055 145.0534624  18.57587280 126.47758958
## Recep-Err               0.5537504321  -1.0472981  -3.12184583   2.07454776
## Recep-Neg               2.9440027653  21.9445357  -5.28218977  27.22672543
## Recep-Exc               5.5955755271  88.2614789  27.10106291  61.16041595
## Recep-ExcPorc           0.0111959903   0.4023086   0.26068657   0.14162202
## Recep-Efic              0.0134185966   0.5417512   0.32650147   0.21524974
## Ataque-Tot             20.9018320083 339.7855312 105.16786208 234.61766909
## Ataque-Err              1.7417905289  19.1330222   1.55565157  17.57737066
## Ataque-Blo              1.2326304874  12.6396186   0.46776702  12.17185160
## Ataque-Exc              7.6055997235 163.3295166  65.05526270  98.27425395
## Ataque-ExcPorc          0.0001901141   0.3592459   0.25013308   0.10911280
## Ataque-Efic             0.0026996198   0.5537183   0.38780894   0.16590938
## Bloqueo-Red            -0.0179744210  -0.3263769  -0.09112513  -0.23525176
## Bloqueo-Pts             1.2371240926  31.2996745  16.95502074  14.34465376
## Bloqueo-Puntos por set -0.0762530245   2.9224047   2.76870031   0.15370434
## Ganado/Perdido          0.0031109575   2.9311989   2.53746111   0.39373776
##                                G-P   Saque-Tot   Saque-Pts   Saque-Err
## Sets jugados            4.54338057  12.9989630  0.54372624  1.31489803
## Tot                   159.80344798 254.5527711 17.85836502 21.95876541
## BP                     90.50470964 113.1505358 14.01615970  6.62016073
## G                      69.29873833 141.4022353  3.84220532 15.33860468
## G-P                   187.52942447 182.2379882 17.92490494  3.98327860
## Saque-Tot             182.23798825 340.5549026 20.19011407 27.61222491
## Saque-Pts              17.92490494  20.1901141  7.56463878  1.52186312
## Saque-Err               3.98327860  27.6122249  1.52186312 13.41443427
## Saque-Pts por set       3.65265296   1.3449361  1.81958175 -0.03490321
## Saque-Efic              0.30532319   0.1360076  0.08501901 -0.12707224
## Recep-Tot              16.19184238 200.7567692  0.01520913 25.17962899
## Recep-Err             -13.20169374   1.3879479 -0.78707224  1.21955294
## Recep-Neg             -17.95329243  35.2581519 -1.63403042  6.89553808
## Recep-Exc              41.84060664 115.5026501  5.21958175 13.16426144
## Recep-ExcPorc           0.47485007   0.4656671  0.06681559  0.04337409
## Recep-Efic              0.67199577   0.6200985  0.07957224  0.05090693
## Ataque-Tot            154.25341341 445.3877751 10.97433460 34.24811326
## Ataque-Err             -8.77134462  25.3773476 -0.78326996  1.18418021
## Ataque-Blo             -9.72614933  17.9067865 -0.02091255  2.15448208
## Ataque-Exc            114.25868476 196.9273534  8.50855513 18.32424530
## Ataque-ExcPorc          0.53538023   0.3210773  0.04342205  0.04373257
## Ataque-Efic             0.90950095   0.5576743  0.06708175  0.06078105
## Bloqueo-Red            -0.04359661  -0.3578177 -0.01235741 -0.08069766
## Bloqueo-Pts            27.62992568  37.4048277  1.78231939  2.10981968
## Bloqueo-Puntos por set  5.13295887   2.2662404  0.16958175 -0.23072359
## Ganado/Perdido          4.59639647   3.1255329  0.47813688 -0.02567980
##                       Saque-Pts por set    Saque-Efic    Recep-Tot
## Sets jugados              -0.068510197 -0.0013307985  11.70203941
## Tot                        1.895290356  0.1248669202 145.05346238
## BP                         2.831740408  0.1697338403  18.57587280
## G                         -0.936450052 -0.0448669202 126.47758958
## G-P                        3.652652955  0.3053231939  16.19184238
## Saque-Tot                  1.344936053  0.1360076046 200.75676921
## Saque-Pts                  1.819581749  0.0850190114   0.01520913
```

```
## Saque-Err                   -0.034903215 -0.1270722433  25.17962899
## Saque-Pts por set            0.524522987  0.0239353612  -4.04452126
## Saque-Efic                   0.023935361  0.0027840304  -0.19231939
## Recep-Tot                   -4.044521258 -0.1923193916 299.49994239
## Recep-Err                   -0.457068787 -0.0249429658  18.89918193
## Recep-Neg                   -1.503586243 -0.0852091255  88.20267312
## Recep-Exc                   -0.546327342 -0.0322813688 113.38080424
## Recep-ExcPorc                0.014559367  0.0005665399  -0.10400277
## Recep-Efic                   0.017946682  0.0007319392  -0.12180781
## Ataque-Tot                  -3.848556861 -0.0130038023 448.86599839
## Ataque-Err                  -0.820048393 -0.0108365019  49.39877866
## Ataque-Blo                  -0.445229865 -0.0176045627  35.28424934
## Ataque-Exc                  -0.025829589  0.0184410646 129.11141837
## Ataque-ExcPorc               0.013353612  0.0003467681  -0.30732573
## Ataque-Efic                  0.019808935  0.0006197719  -0.44732573
## Bloqueo-Red                  0.001927065  0.0007984791  -0.59200369
## Bloqueo-Pts                  0.101650536  0.0214068441  15.82705381
## Bloqueo-Puntos por set       0.081610785  0.0070646388  -3.35422284
## Ganado/Perdido               0.138290702  0.0089733840  -3.04090333
##                            Recep-Err    Recep-Neg    Recep-Exc Recep-ExcPorc
## Sets jugados             0.55375043   2.94400277   5.59557553  0.0111959903
## Tot                     -1.04729808  21.94453566  88.26147886  0.4023085897
## BP                      -3.12184583  -5.28218977  27.10106291  0.2606865710
## G                        2.07454776  27.22672543  61.16041595  0.1416220187
## G-P                    -13.20169374 -17.95329243  41.84060664  0.4748500691
## Saque-Tot                1.38794792  35.25815186 115.50265007  0.4656671275
## Saque-Pts               -0.78707224  -1.63403042   5.21958175  0.0668155894
## Saque-Err                1.21955294   6.89553808  13.16426144  0.0433740926
## Saque-Pts por set       -0.45706879  -1.50358624  -0.54632734  0.0145593674
## Saque-Efic              -0.02494297  -0.08520913  -0.03228137  0.0005665399
## Recep-Tot               18.89918193  88.20267312 113.38080424 -0.1040027653
## Recep-Err                7.59880171   7.22738795   4.41312363 -0.0467213965
## Recep-Neg                7.22738795  68.94606233   1.73800265 -0.4337517283
## Recep-Exc                4.41312363   1.73800265 127.65536064  0.0513251815
## Recep-ExcPorc           -0.04672140  -0.43375173   1.05132518  0.0147794547
## Recep-Efic              -0.13167473  -0.45754623   1.08588705  0.0153904208
## Ataque-Tot              10.58272842  93.29552656 214.66748761  0.4468635499
## Ataque-Err               1.52045166  13.65750663  15.94567346 -0.0537141376
## Ataque-Blo               1.79755732  12.08592580  12.87328609 -0.0151944348
## Ataque-Exc              -0.30112916  19.64092925  73.64389619  0.2895087280
## Ataque-ExcPorc          -0.04283904  -0.13339037  -0.04440431  0.0011363118
## Ataque-Efic             -0.06084284  -0.22989702  -0.01341096  0.0023385456
## Bloqueo-Red             -0.05778315  -0.15564869  -0.34279583 -0.0016129450
## Bloqueo-Pts              0.02287130   3.90616719   9.37347333  0.0462698756
## Bloqueo-Puntos por set  -0.37741675  -1.03816684  -0.86328494  0.0086258209
## Ganado/Perdido          -0.47626455  -1.60161021  -0.06102374  0.0154748531
##                           Recep-Efic  Ataque-Tot  Ataque-Err  Ataque-Blo
## Sets jugados           0.0134185966  20.9018320  1.74179053  1.23263049
## Tot                    0.5417512098 339.7855312 19.13302224 12.63961862
## BP                     0.3265014691 105.1678621  1.55565157  0.46776702
## G                      0.2152497408 234.6176691 17.57737066 12.17185160
## G-P                    0.6719957656 154.2534134 -8.77134462 -9.72614933
## Saque-Tot              0.6200985137 445.3877751 25.37734762 17.90678650
## Saque-Pts              0.0795722433  10.9743346 -0.78326996 -0.02091255
```

```
## Saque-Err               0.0509069305  34.2481133  1.18418021  2.15448208
## Saque-Pts por set       0.0179466816  -3.8485569 -0.82004839 -0.44522987
## Saque-Efic              0.0007319392  -0.0130038 -0.01083650 -0.01760456
## Recep-Tot              -0.1218078120 448.8659984 49.39877866 35.28424934
## Recep-Err              -0.1316747321  10.5827284  1.52045166  1.79755732
## Recep-Neg              -0.4575462323  93.2955266 13.65750663 12.08592580
## Recep-Exc               1.0858870550 214.6674876 15.94567346 12.87328609
## Recep-ExcPorc           0.0153904208   0.4468635 -0.05371414 -0.01519443
## Recep-Efic              0.0171696725   0.6577147 -0.03828379 -0.01066454
## Ataque-Tot              0.6577147425 974.1939019 87.83483120 52.72194377
## Ataque-Err             -0.0382837885  87.8348312 20.55144602  4.64281599
## Ataque-Blo             -0.0106645351  52.7219438  4.64281599 13.75521373
## Ataque-Exc              0.4021210681 293.1919144 18.85902754 12.14486116
## Ataque-ExcPorc          0.0015317490  -0.4723257 -0.11662864 -0.06032953
## Ataque-Efic             0.0028821768  -0.3917221 -0.21064005 -0.14501584
## Bloqueo-Red            -0.0012439509  -0.7833708 -0.10675193 -0.03764835
## Bloqueo-Pts             0.0605863291  35.4747811  1.05179168  0.49997119
## Bloqueo-Puntos por set  0.0113371932  -3.6552080 -0.91325037 -0.68201406
## Ganado/Perdido          0.0198708088  -0.6520769 -0.59148519 -0.56985252
##                          Ataque-Exc Ataque-ExcPorc   Ataque-Efic   Bloqueo-Red
## Sets jugados             7.60559972   0.0001901141  0.0026996198 -0.0179744210
## Tot                    163.32951665   0.3592458809  0.5537183143 -0.3263768867
## BP                      65.05526270   0.2501330798  0.3878089354 -0.0911251296
## G                       98.27425395   0.1091128010  0.1659093790 -0.2352517571
## G-P                    114.25868476   0.5353802281  0.9095009506 -0.0435966125
## Saque-Tot              196.92735338   0.3210773131  0.5576742712 -0.3578177209
## Saque-Pts               8.50855513   0.0434220532  0.0670817490 -0.0123574144
## Saque-Err              18.32424530   0.0437325729  0.0607810520 -0.0806976610
## Saque-Pts por set      -0.02582959   0.0133536122  0.0198089354  0.0019270653
## Saque-Efic              0.01844106   0.0003467681  0.0006197719  0.0007984791
## Recep-Tot              129.11141837  -0.3073257288 -0.4473257288 -0.5920036871
## Recep-Err               -0.30112916  -0.0428390368 -0.0608428390 -0.0577831547
## Recep-Neg              19.64092925  -0.1333903676 -0.2298970215 -0.1556486922
## Recep-Exc              73.64389619  -0.0444043093 -0.0134109632 -0.3427958290
## Recep-ExcPorc           0.28950873   0.0011363118  0.0023385456 -0.0016129450
## Recep-Efic              0.40212107   0.0015317490  0.0028821768 -0.0012439509
## Ataque-Tot             293.19191439  -0.4723257288 -0.3917221166 -0.7833707800
## Ataque-Err              18.85902754  -0.1166286439 -0.2106400507 -0.1067519299
## Ataque-Blo              12.14486116  -0.0603295311 -0.1450158428 -0.0376483466
## Ataque-Exc             138.96507374   0.2787008872  0.4116904309 -0.2839756884
## Ataque-ExcPorc          0.27870089   0.0039462611  0.0049517744 -0.0001204056
## Ataque-Efic             0.41169043   0.0049517744  0.0076283428  0.0003025982
## Bloqueo-Red            -0.28397569  -0.0001204056  0.0003025982  0.0411193686
## Bloqueo-Pts             15.81206072   0.0371926489  0.0750110900 -0.0301446019
## Bloqueo-Puntos por set -0.16250144   0.0133434728  0.0232769328  0.0040384837
## Ganado/Perdido          1.87462553   0.0183713561  0.0277867554  0.0058042401
##                        Bloqueo-Pts Bloqueo-Puntos por set Ganado/Perdido
## Sets jugados            1.23712409           -0.076253025    0.003110957
## Tot                    31.29967450            2.922404655    2.931198871
## BP                     16.95502074            2.768700311    2.537461113
## G                      14.34465376            0.153704344    0.393737758
## G-P                    27.62992568            5.132958866    4.596396474
## Saque-Tot              37.40482775            2.266240350    3.125532895
## Saque-Pts               1.78231939            0.169581749    0.478136882
```

```
## Saque-Err               2.10981968          -0.230723586   -0.025679802
## Saque-Pts por set       0.10165054           0.081610785    0.138290702
## Saque-Efic              0.02140684           0.007064639    0.008973384
## Recep-Tot              15.82705381          -3.354222837   -3.040903330
## Recep-Err               0.02287130          -0.377416753   -0.476264547
## Recep-Neg               3.90616719          -1.038166839   -1.601610209
## Recep-Exc               9.37347333          -0.863284941   -0.061023735
## Recep-ExcPorc           0.04626988           0.008625821    0.015474853
## Recep-Efic              0.06058633           0.011337193    0.019870809
## Ataque-Tot             35.47478108          -3.655207973   -0.652076852
## Ataque-Err              1.05179168          -0.913250374   -0.591485194
## Ataque-Blo              0.49997119          -0.682014057   -0.569852518
## Ataque-Exc             15.81206072          -0.162501440    1.874625533
## Ataque-ExcPorc          0.03719265           0.013343473    0.018371356
## Ataque-Efic             0.07501109           0.023276933    0.027786755
## Bloqueo-Red            -0.03014460           0.004038484    0.005804240
## Bloqueo-Pts            13.71999942           2.922473787    0.580351999
## Bloqueo-Puntos por set  2.92247379           0.873526904    0.169276414
## Ganado/Perdido          0.58035200           0.169276414    0.250936168
```

```
cor = cor(partidos2021[,2:26])
round(cor,3)
```

```
##                        Sets jugados    Tot     BP      G    G-P Saque-Tot
## Sets jugados                  1.000  0.798  0.501  0.817  0.411     0.873
## Tot                           0.798  1.000  0.813  0.861  0.800     0.946
## BP                            0.501  0.813  1.000  0.404  0.816     0.757
## G                             0.817  0.861  0.404  1.000  0.545     0.826
## G-P                           0.411  0.800  0.816  0.545  1.000     0.721
## Saque-Tot                     0.873  0.946  0.757  0.826  0.721     1.000
## Saque-Pts                     0.245  0.445  0.629  0.151  0.476     0.398
## Saque-Err                     0.445  0.411  0.223  0.451  0.079     0.409
## Saque-Pts por set            -0.117  0.180  0.483 -0.139  0.368     0.101
## Saque-Efic                   -0.031  0.162  0.397 -0.092  0.423     0.140
## Recep-Tot                     0.838  0.575  0.132  0.788  0.068     0.629
## Recep-Err                     0.249 -0.026 -0.140  0.081 -0.350     0.027
## Recep-Neg                     0.439  0.181 -0.079  0.353 -0.158     0.230
## Recep-Exc                     0.614  0.536  0.296  0.583  0.270     0.554
## Recep-ExcPorc                 0.114  0.227  0.265  0.126  0.285     0.208
## Recep-Efic                    0.127  0.284  0.308  0.177  0.374     0.256
## Ataque-Tot                    0.830  0.747  0.416  0.810  0.361     0.773
## Ataque-Err                    0.476  0.290  0.042  0.418 -0.141     0.303
## Ataque-Blo                    0.412  0.234  0.016  0.354 -0.192     0.262
## Ataque-Exc                    0.799  0.950  0.681  0.898  0.708     0.905
## Ataque-ExcPorc                0.004  0.392  0.491  0.187  0.622     0.277
## Ataque-Efic                   0.038  0.435  0.548  0.205  0.760     0.346
## Bloqueo-Red                  -0.110 -0.110 -0.055 -0.125 -0.016    -0.096
## Bloqueo-Pts                   0.414  0.580  0.565  0.417  0.545     0.547
## Bloqueo-Puntos por set       -0.101  0.214  0.366  0.018  0.401     0.131
##                        Saque-Pts Saque-Err Saque-Pts por set Saque-Efic
## Sets jugados               0.245     0.445            -0.117     -0.031
## Tot                        0.445     0.411             0.180      0.162
## BP                         0.629     0.223             0.483      0.397
## G                          0.151     0.451            -0.139     -0.092
```

```
## G-P                       0.476     0.079            0.368      0.423
## Saque-Tot                 0.398     0.409            0.101      0.140
## Saque-Pts                 1.000     0.151            0.913      0.586
## Saque-Err                 0.151     1.000           -0.013     -0.658
## Saque-Pts por set         0.913    -0.013            1.000      0.626
## Saque-Efic                0.586    -0.658            0.626      1.000
## Recep-Tot                 0.000     0.397           -0.323     -0.211
## Recep-Err                -0.104     0.121           -0.229     -0.171
## Recep-Neg                -0.072     0.227           -0.250     -0.194
## Recep-Exc                 0.168     0.318           -0.067     -0.054
## Recep-ExcPorc             0.200     0.097            0.165      0.088
## Recep-Efic                0.221     0.106            0.189      0.106
## Ataque-Tot                0.128     0.300           -0.170     -0.008
## Ataque-Err               -0.063     0.071           -0.250     -0.045
## Ataque-Blo               -0.002     0.159           -0.166     -0.090
## Ataque-Exc                0.262     0.424           -0.003      0.030
## Ataque-ExcPorc            0.251     0.190            0.294      0.105
## Ataque-Efic               0.279     0.190            0.313      0.134
## Bloqueo-Red              -0.022    -0.109            0.013      0.075
## Bloqueo-Pts               0.175     0.156            0.038      0.110
## Bloqueo-Puntos por set    0.066    -0.067            0.121      0.143
##                       Recep-Tot Recep-Err Recep-Neg Recep-Exc Recep-ExcPorc
## Sets jugados              0.838     0.249     0.439     0.614         0.114
## Tot                       0.575    -0.026     0.181     0.536         0.227
## BP                        0.132    -0.140    -0.079     0.296         0.265
## G                         0.788     0.081     0.353     0.583         0.126
## G-P                       0.068    -0.350    -0.158     0.270         0.285
## Saque-Tot                 0.629     0.027     0.230     0.554         0.208
## Saque-Pts                 0.000    -0.104    -0.072     0.168         0.200
## Saque-Err                 0.397     0.121     0.227     0.318         0.097
## Saque-Pts por set        -0.323    -0.229    -0.250    -0.067         0.165
## Saque-Efic               -0.211    -0.171    -0.194    -0.054         0.088
## Recep-Tot                 1.000     0.396     0.614     0.580        -0.049
## Recep-Err                 0.396     1.000     0.316     0.142        -0.139
## Recep-Neg                 0.614     0.316     1.000     0.019        -0.430
## Recep-Exc                 0.580     0.142     0.019     1.000         0.765
## Recep-ExcPorc            -0.049    -0.139    -0.430     0.765         1.000
## Recep-Efic               -0.054    -0.365    -0.421     0.733         0.966
## Ataque-Tot                0.831     0.123     0.360     0.609         0.118
## Ataque-Err                0.630     0.122     0.363     0.311        -0.097
## Ataque-Blo                0.550     0.176     0.392     0.307        -0.034
## Ataque-Exc                0.633    -0.009     0.201     0.553         0.202
## Ataque-ExcPorc           -0.283    -0.247    -0.256    -0.063         0.149
## Ataque-Efic              -0.296    -0.253    -0.317    -0.014         0.220
## Bloqueo-Red              -0.169    -0.103    -0.092    -0.150        -0.065
## Bloqueo-Pts               0.247     0.002     0.127     0.224         0.103
## Bloqueo-Puntos por set   -0.207    -0.146    -0.134    -0.082         0.076
##                       Recep-Efic Ataque-Tot Ataque-Err Ataque-Blo Ataque-Exc
## Sets jugados               0.127      0.830      0.476      0.412      0.799
## Tot                        0.284      0.747      0.290      0.234      0.950
## BP                         0.308      0.416      0.042      0.016      0.681
## G                          0.177      0.810      0.418      0.354      0.898
## G-P                        0.374      0.361     -0.141     -0.192      0.708
## Saque-Tot                  0.256      0.773      0.303      0.262      0.905
```

```
## Saque-Pts                   0.221      0.128     -0.063     -0.002      0.262
## Saque-Err                   0.106      0.300      0.071      0.159      0.424
## Saque-Pts por set           0.189     -0.170     -0.250     -0.166     -0.003
## Saque-Efic                  0.106     -0.008     -0.045     -0.090      0.030
## Recep-Tot                  -0.054      0.831      0.630      0.550      0.633
## Recep-Err                  -0.365      0.123      0.122      0.176     -0.009
## Recep-Neg                  -0.421      0.360      0.363      0.392      0.201
## Recep-Exc                   0.733      0.609      0.311      0.307      0.553
## Recep-ExcPorc               0.966      0.118     -0.097     -0.034      0.202
## Recep-Efic                  1.000      0.161     -0.064     -0.022      0.260
## Ataque-Tot                  0.161      1.000      0.621      0.455      0.797
## Ataque-Err                 -0.064      0.621      1.000      0.276      0.353
## Ataque-Blo                 -0.022      0.455      0.276      1.000      0.278
## Ataque-Exc                  0.260      0.797      0.353      0.278      1.000
## Ataque-ExcPorc              0.186     -0.241     -0.410     -0.259      0.376
## Ataque-Efic                 0.252     -0.144     -0.532     -0.448      0.400
## Bloqueo-Red                -0.047     -0.124     -0.116     -0.050     -0.119
## Bloqueo-Pts                 0.125      0.307      0.063      0.036      0.362
## Bloqueo-Puntos por set      0.093     -0.125     -0.216     -0.197     -0.015
##                        Ataque-ExcPorc Ataque-Efic Bloqueo-Red Bloqueo-Pts
## Sets jugados                    0.004       0.038      -0.110       0.414
## Tot                             0.392       0.435      -0.110       0.580
## BP                              0.491       0.548      -0.055       0.565
## G                               0.187       0.205      -0.125       0.417
## G-P                             0.622       0.760      -0.016       0.545
## Saque-Tot                       0.277       0.346      -0.096       0.547
## Saque-Pts                       0.251       0.279      -0.022       0.175
## Saque-Err                       0.190       0.190      -0.109       0.156
## Saque-Pts por set               0.294       0.313       0.013       0.038
## Saque-Efic                      0.105       0.134       0.075       0.110
## Recep-Tot                      -0.283      -0.296      -0.169       0.247
## Recep-Err                      -0.247      -0.253      -0.103       0.002
## Recep-Neg                      -0.256      -0.317      -0.092       0.127
## Recep-Exc                      -0.063      -0.014      -0.150       0.224
## Recep-ExcPorc                   0.149       0.220      -0.065       0.103
## Recep-Efic                      0.186       0.252      -0.047       0.125
## Ataque-Tot                     -0.241      -0.144      -0.124       0.307
## Ataque-Err                     -0.410      -0.532      -0.116       0.063
## Ataque-Blo                     -0.259      -0.448      -0.050       0.036
## Ataque-Exc                      0.376       0.400      -0.119       0.362
## Ataque-ExcPorc                  1.000       0.903      -0.009       0.160
## Ataque-Efic                     0.903       1.000       0.017       0.232
## Bloqueo-Red                    -0.009       0.017       1.000      -0.040
## Bloqueo-Pts                     0.160       0.232      -0.040       1.000
## Bloqueo-Puntos por set          0.227       0.285       0.021       0.844
##                        Bloqueo-Puntos por set
## Sets jugados                           -0.101
## Tot                                     0.214
## BP                                      0.366
## G                                       0.018
## G-P                                     0.401
## Saque-Tot                               0.131
## Saque-Pts                               0.066
## Saque-Err                              -0.067
```

```
## Saque-Pts por set                    0.121
## Saque-Efic                           0.143
## Recep-Tot                           -0.207
## Recep-Err                           -0.146
## Recep-Neg                           -0.134
## Recep-Exc                           -0.082
## Recep-ExcPorc                        0.076
## Recep-Efic                           0.093
## Ataque-Tot                          -0.125
## Ataque-Err                          -0.216
## Ataque-Blo                          -0.197
## Ataque-Exc                          -0.015
## Ataque-ExcPorc                       0.227
## Ataque-Efic                          0.285
## Bloqueo-Red                          0.021
## Bloqueo-Pts                          0.844
## Bloqueo-Puntos por set               1.000
```

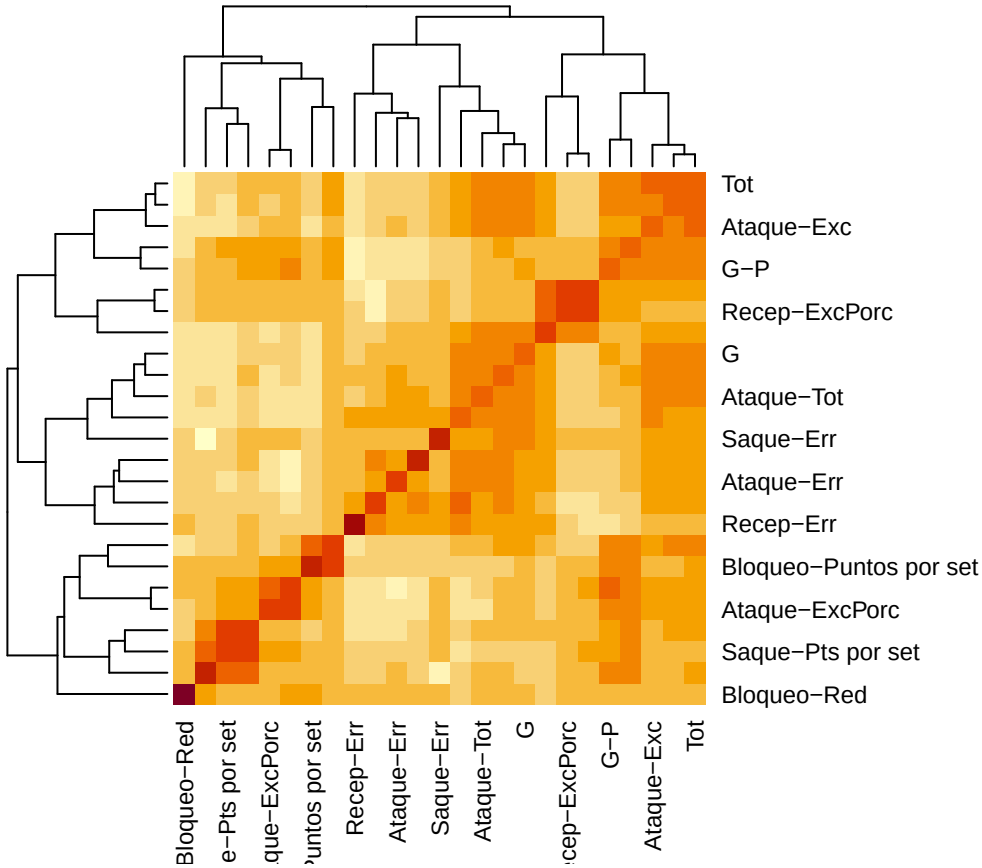
Para ver si hay variables explicativas que se encuentren muy correlacionadas realizamos el determinante de la matriz de correlaciones

```
det(cor)
```

```
## [1] -1.772039e-53
```

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(partidos2021[,2:26])
correlacionMax=0.9
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,] "Tot"               "Saque-Tot"         "0.946195693597673"
##  [2,] "Tot"               "Ataque-Exc"        "0.950404649174884"
##  [3,] "Saque-Tot"         "Tot"               "0.946195693597673"
##  [4,] "Saque-Tot"         "Ataque-Exc"        "0.905231472292508"
##  [5,] "Saque-Pts"         "Saque-Pts por set" "0.913471941405401"
##  [6,] "Saque-Pts por set" "Saque-Pts"         "0.913471941405401"
##  [7,] "Recep-ExcPorc"     "Recep-Efic"        "0.966140492439033"
##  [8,] "Recep-Efic"        "Recep-ExcPorc"     "0.966140492439033"
##  [9,] "Ataque-Exc"        "Tot"               "0.950404649174884"
## [10,] "Ataque-Exc"        "Saque-Tot"         "0.905231472292508"
## [11,] "Ataque-ExcPorc"    "Ataque-Efic"       "0.902511700100126"
## [12,] "Ataque-Efic"       "Ataque-ExcPorc"    "0.902511700100126"
```

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

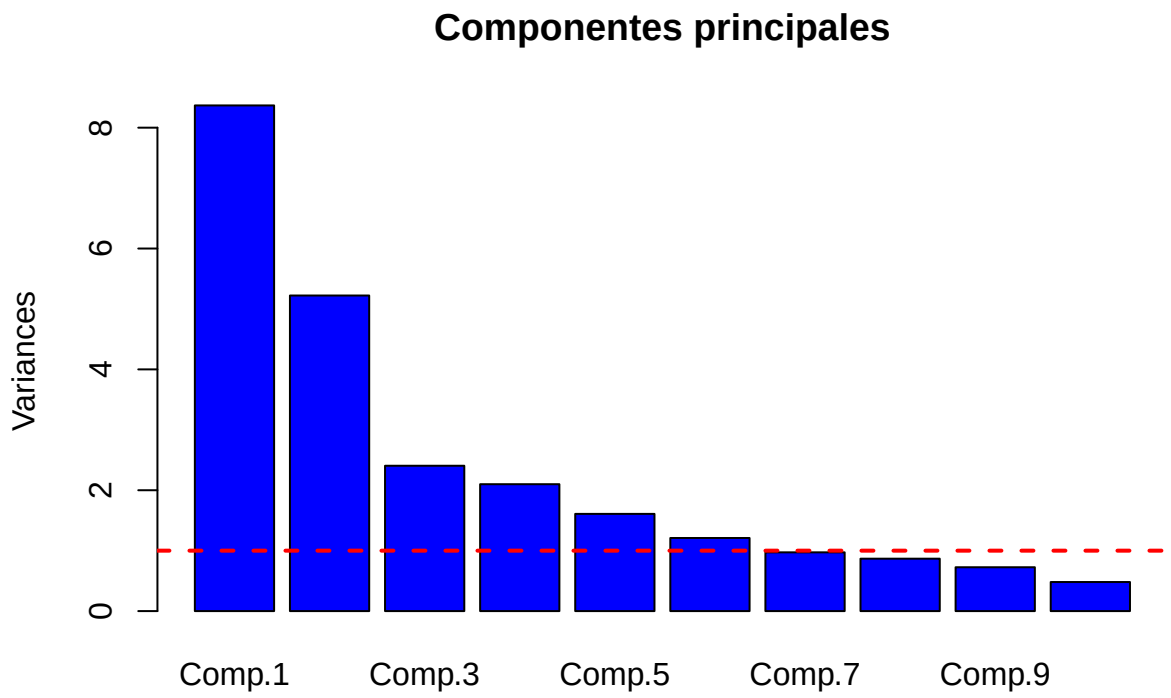
Objetivo central del Análisis de Comp. Principales (ACP): reducir la dimensión de un conjunto de datos, descritos por un número elevado de variables aleatorias interrelacionadas entre sí, reteniendo tanto como sea posible la variación que presenta dicho conjunto de datos. Se trata de explicar la estructura 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(partidos2021[,2:26], cor=TRUE) #cor=TRUE variables tipificadas ya que las escalas son mu
summary(acp)
```

```
## Importance of components:
##                           Comp.1    Comp.2     Comp.3     Comp.4     Comp.5
## Standard deviation     2.8927871 2.2852761 1.55082509 1.44910185 1.26835091
## Proportion of Variance 0.3347287 0.2088995 0.09620234 0.08399585 0.06434856
## Cumulative Proportion  0.3347287 0.5436282 0.63983051 0.72382635 0.78817491
##                            Comp.6     Comp.7     Comp.8     Comp.9    Comp.10
## Standard deviation     1.09979814 0.98607244 0.93120498 0.85164894 0.69363942
## Proportion of Variance 0.04838224 0.03889355 0.03468571 0.02901224 0.01924543
## Cumulative Proportion  0.83655715 0.87545071 0.91013641 0.93914865 0.95839408
##                           Comp.11    Comp.12     Comp.13     Comp.14    Comp.15
## Standard deviation     0.60573572 0.54205935 0.419284192 0.252243492 0.20911961
## Proportion of Variance 0.01467663 0.01175313 0.007031969 0.002545071 0.00174924
## Cumulative Proportion  0.97307071 0.98482384 0.991855810 0.994400882 0.99615012
##                            Comp.16      Comp.17     Comp.18      Comp.19
## Standard deviation     0.168531227 0.1374637767 0.127917255 0.1174638801
## Proportion of Variance 0.001136111 0.0007558516 0.000654513 0.0005519105
## Cumulative Proportion  0.997286233 0.9980420846 0.998696598 0.9992485081
##                            Comp.20      Comp.21      Comp.22      Comp.23
## Standard deviation     0.1095729518 0.0700011360 0.0431541414 4.316000e-03
## Proportion of Variance 0.0004802493 0.0001960064 0.0000744912 7.451142e-07
## Cumulative Proportion  0.9997287573 0.9999247637 0.9999992549 1.000000e+00
##                            Comp.24 Comp.25
## Standard deviation     1.947230e-08       0
## Proportion of Variance 1.516681e-17       0
## Cumulative Proportion  1.000000e+00       1
```

```
# 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,] 8.368217e+00 3.347287e+01             33.47287
##  [2,] 5.222487e+00 2.088995e+01             54.36282
##  [3,] 2.405058e+00 9.620234e+00             63.98305
##  [4,] 2.099896e+00 8.399585e+00             72.38264
##  [5,] 1.608714e+00 6.434856e+00             78.81749
##  [6,] 1.209556e+00 4.838224e+00             83.65572
##  [7,] 9.723388e-01 3.889355e+00             87.54507
##  [8,] 8.671427e-01 3.468571e+00             91.01364
##  [9,] 7.253059e-01 2.901224e+00             93.91487
## [10,] 4.811356e-01 1.924543e+00             95.83941
## [11,] 3.669158e-01 1.467663e+00             97.30707
## [12,] 2.938283e-01 1.175313e+00             98.48238
## [13,] 1.757992e-01 7.031969e-01             99.18558
## [14,] 6.362678e-02 2.545071e-01             99.44009
## [15,] 4.373101e-02 1.749240e-01             99.61501
## [16,] 2.840277e-02 1.136111e-01             99.72862
## [17,] 1.889629e-02 7.558516e-02             99.80421
```

```
## [18,] 1.636282e-02 6.545130e-02             99.86966
## [19,] 1.379776e-02 5.519105e-02             99.92485
## [20,] 1.200623e-02 4.802493e-02             99.97288
## [21,] 4.900159e-03 1.960064e-02             99.99248
## [22,] 1.862280e-03 7.449120e-03             99.99993
## [23,] 1.862785e-05 7.451142e-05            100.00000
## [24,] 3.791704e-16 1.516681e-15            100.00000
## [25,] 0.000000e+00 0.000000e+00            100.00000
```

Hasta la 10 tenemos un 95% de la variabilidad explicada

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

```
apply(partidos2021[,2:26],2 ,shapiro.test)
```

```
## $`Sets jugados`
##
##  Shapiro-Wilk normality test
##
## data:  newX[, i]
## W = 0.7787, p-value < 2.2e-16
##
##
## $Tot
##
##  Shapiro-Wilk normality test
##
## data:  newX[, i]
## W = 0.98366, p-value = 0.004061
##
##
## $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
##
##
## $`G-P`
##
##  Shapiro-Wilk normality test
##
## data:  newX[, i]
## W = 0.9521, p-value = 1.266e-07
```

```
##
##
## $`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
##
##
## $`Saque-Pts por set`
##
##  Shapiro-Wilk normality test
##
## data:  newX[, i]
## W = 0.93823, p-value = 4.502e-09
##
##
## $`Saque-Efic`
##
##  Shapiro-Wilk normality test
##
## data:  newX[, i]
## W = 0.99116, p-value = 0.1125
##
##
## $`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
##
##
## $`Recep-ExcPorc`
##
##  Shapiro-Wilk normality test
##
## data:  newX[, i]
## W = 0.97546, p-value = 0.000162
##
##
## $`Recep-Efic`
##
##  Shapiro-Wilk normality test
##
## data:  newX[, i]
## W = 0.98847, p-value = 0.03335
##
##
## $`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
##
##
## $`Ataque-ExcPorc`
##
##  Shapiro-Wilk normality test
##
## data:  newX[, i]
## W = 0.98662, p-value = 0.01464
##
##
## $`Ataque-Efic`
##
##  Shapiro-Wilk normality test
##
## data:  newX[, i]
## W = 0.99022, p-value = 0.07381
##
##
## $`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
##
##
## $`Bloqueo-Puntos por set`
##
##  Shapiro-Wilk normality test
##
## data:  newX[, i]
## W = 0.9658, p-value = 6.241e-06
```

Se rechaza normalidad univariante para todas las variables excepto *Saque-Efic* y *Ataque-Efic*. No tenemos

normalidad multivariante

Coeficientes y correlaciones de las C.P

```
loadings(acp)[,1:6] #Coeficientes que definen cada combinación lineal, si cogemos las 6 c.p
```

```
##                             Comp.1       Comp.2      Comp.3       Comp.4
## Sets jugados            0.301307447  0.152772162  0.03509568  0.028709502
## Tot                     0.338055832 -0.050040329  0.08659164 -0.011009030
## BP                      0.258131805 -0.213304107  0.11294693  0.096565571
## G                       0.305660251  0.107646007  0.03740425 -0.101614568
## G-P                     0.247827849 -0.267613899  0.10077697 -0.032410939
## Saque-Tot               0.331706852 -0.006827743  0.07227590  0.005731932
## Saque-Pts               0.142775656 -0.209710460  0.05238400  0.395447704
## Saque-Err               0.156047581  0.080473512 -0.02059478 -0.335619834
## Saque-Pts por set       0.039547889 -0.284351897  0.04775183  0.383412147
## Saque-Efic              0.035678898 -0.216028057  0.08030892  0.530027946
## Recep-Tot               0.233598010  0.302555306  0.02072397  0.035128223
## Recep-Err               0.009021193  0.210260460  0.08900300  0.002136135
## Recep-Neg               0.080099111  0.271417590  0.27418495  0.037438717
## Recep-Exc               0.232632792  0.068190395 -0.42924404  0.009210694
## Recep-ExcPorc           0.110239204 -0.149516153 -0.54440806 -0.024451126
## Recep-Efic              0.126046570 -0.168430946 -0.52781997 -0.022242111
## Ataque-Tot              0.279755651  0.191368518 -0.03769108  0.109762680
## Ataque-Err              0.121097759  0.264343686 -0.02691267  0.207083817
## Ataque-Blo              0.104678503  0.232015963 -0.04489901  0.152675953
## Ataque-Exc              0.324470324  0.013470557  0.03330705 -0.078576863
## Ataque-ExcPorc          0.095458951 -0.294671587  0.12350958 -0.282867594
## Ataque-Efic             0.112719979 -0.329461748  0.10552813 -0.297454408
## Bloqueo-Red            -0.050114012 -0.045837926  0.04570230  0.028877086
## Bloqueo-Pts             0.191614040 -0.084647973  0.19565893 -0.087335314
## Bloqueo-Puntos por set  0.049145495 -0.193602967  0.18721989 -0.127195791
##                             Comp.5       Comp.6
## Sets jugados            0.043411187  0.008891865
## Tot                     0.010897500 -0.046957420
## BP                     -0.014360708  0.069706823
## G                       0.029658757 -0.134633791
## G-P                    -0.050370977 -0.199566999
## Saque-Tot               0.010597249 -0.046125196
## Saque-Pts               0.246354636  0.312447360
## Saque-Err               0.304995010  0.399177686
## Saque-Pts por set       0.235373916  0.290880348
## Saque-Efic             -0.096355931 -0.173131427
## Recep-Tot               0.008418386  0.029758333
## Recep-Err               0.048995019  0.419351904
## Recep-Neg               0.044047631  0.123519278
## Recep-Exc              -0.066240220  0.113287554
## Recep-ExcPorc          -0.096585759  0.121989993
## Recep-Efic             -0.099415910  0.006155657
## Ataque-Tot             -0.050703742 -0.165205982
## Ataque-Err             -0.104046131 -0.199007158
## Ataque-Blo              0.017029128  0.089821619
## Ataque-Exc              0.121799953 -0.208136900
## Ataque-ExcPorc          0.241339085 -0.083029397
```

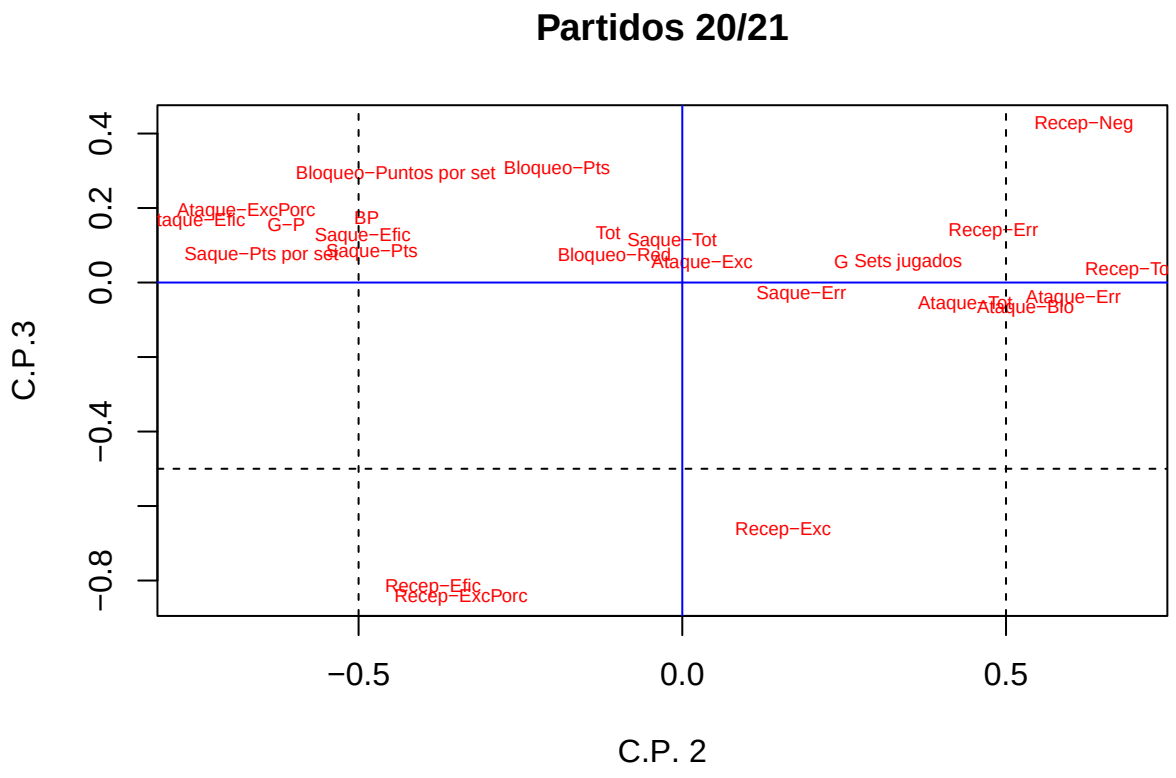
```
## Ataque-Efic             0.187385516 -0.088597202
## Bloqueo-Red            -0.047286627 -0.291814128
## Bloqueo-Pts            -0.529035395  0.245756966
## Bloqueo-Puntos por set -0.586393788  0.250780551
```

```
#para calcular las correlaciones entre las
#variables y las componentes
cor_vc<-loadings(acp)%*%diag(acp$sdev) #coeficientes*desvtipica
cor_vc[,1:6] # par las 6 comp. principales
```

```
##                              [,1]        [,2]        [,3]         [,4]
## Sets jugados             0.87161830  0.34912657  0.05442725  0.041602993
## Tot                      0.97792356 -0.11435597  0.13428848 -0.015953206
## BP                       0.74672036 -0.48745878  0.17516093  0.139933348
## G                        0.88421004  0.24600085  0.05800745 -0.147249858
## G-P                      0.71691321 -0.61157165  0.15628745 -0.046966752
## Saque-Tot                0.95955731 -0.01560328  0.11208727  0.008306154
## Saque-Pts                0.41301958 -0.47924630  0.08123841  0.573044000
## Saque-Err                0.45141243  0.18390419 -0.03193891 -0.486347323
## Saque-Pts por set        0.11440362 -0.64982259  0.07405473  0.555603253
## Saque-Efic               0.10321146 -0.49368376  0.12454508  0.768064478
## Recep-Tot                0.67574932  0.69142241  0.03213925  0.050904373
## Recep-Err                0.02609639  0.48050320  0.13802808  0.003095477
## Recep-Neg                0.23170968  0.62026413  0.42521290  0.054252514
## Recep-Exc                0.67295715  0.15583388 -0.66568243  0.013347234
## Recep-ExcPorc            0.31889855 -0.34168569 -0.84428168 -0.035432171
## Recep-Efic               0.36462590 -0.38491122 -0.81855645 -0.032231084
## Ataque-Tot               0.80927354  0.43732990 -0.05845227  0.159057302
## Ataque-Err               0.35031004  0.60409831 -0.04173684  0.300085542
## Ataque-Blo               0.30281263  0.53022053 -0.06963051  0.221243007
## Ataque-Exc               0.93862358  0.03078394  0.05165341 -0.113865878
## Ataque-ExcPorc           0.27614242 -0.67340593  0.19154176 -0.409903954
## Ataque-Efic              0.32607490 -0.75291106  0.16365567 -0.431041734
## Bloqueo-Red             -0.14496917 -0.10475232  0.07087628  0.041845838
## Bloqueo-Pts              0.55429863 -0.19344399  0.30343278 -0.126557766
## Bloqueo-Puntos por set   0.14216745 -0.44243623  0.29034531 -0.184319656
##                              [,5]         [,6]
## Sets jugados             0.05506062  0.009779256
## Tot                      0.01382185 -0.051643683
## BP                      -0.01821442  0.076663434
## G                        0.03761771 -0.148069993
## G-P                     -0.06388807 -0.219483414
## Saque-Tot                0.01344103 -0.050728405
## Saque-Pts                0.31246413  0.343629024
## Saque-Err                0.38684070  0.439014875
## Saque-Pts por set        0.29853672  0.319909664
## Saque-Efic              -0.12221313 -0.190409620
## Recep-Tot                0.01067747  0.032728159
## Recep-Err                0.06214288  0.461202442
## Recep-Neg                0.05586785  0.135846272
## Recep-Exc               -0.08401584  0.124593441
## Recep-ExcPorc           -0.12250464  0.134164366
## Recep-Efic              -0.12609426  0.006769980
## Ataque-Tot              -0.06431014 -0.181693231
```

```
## Ataque-Err              -0.13196701 -0.218867702
## Ataque-Blo               0.02159891  0.098785649
## Ataque-Exc               0.15448508 -0.228908574
## Ataque-ExcPorc           0.30610265 -0.091315576
## Ataque-Efic              0.23767059 -0.097439038
## Bloqueo-Red             -0.05997604 -0.320936634
## Bloqueo-Pts             -0.67100253  0.270283053
## Bloqueo-Puntos por set -0.74375310  0.275807983
```

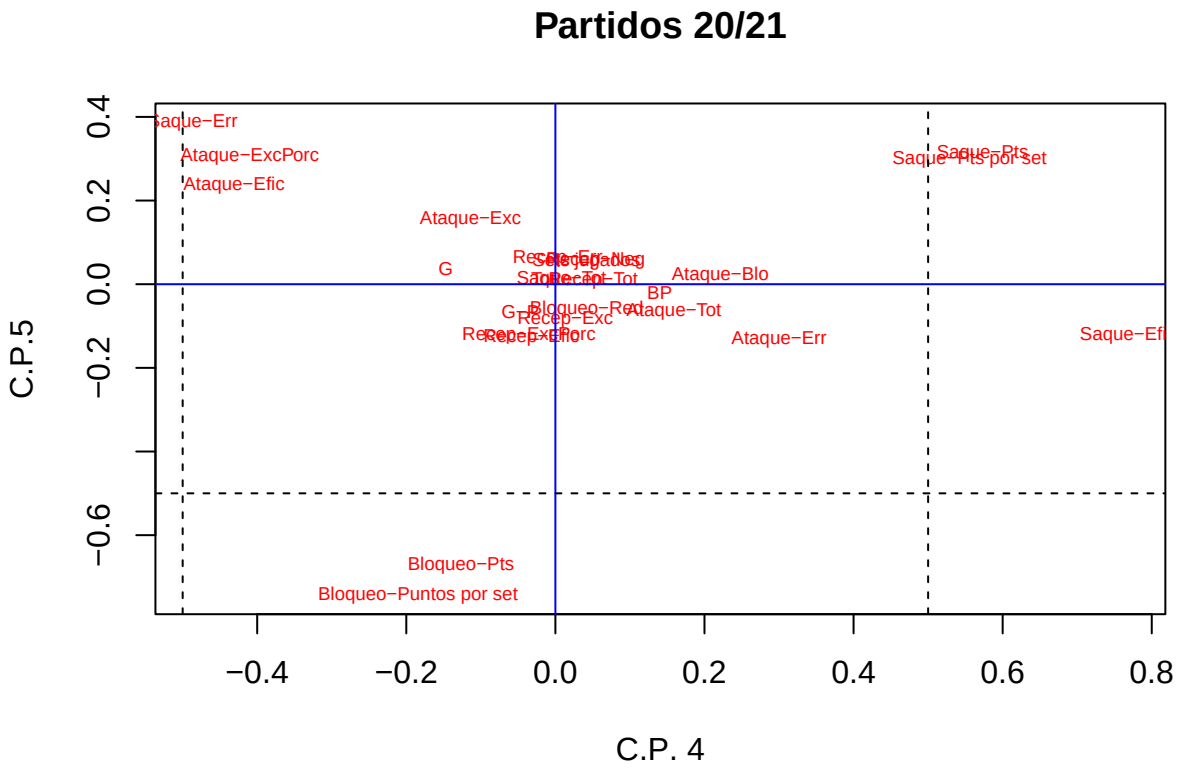
```
#Para ayudar a interpretar las CP:
plot(cor_vc[,2:3],type="n",
     main="Partidos 20/21",
     xlab="C.P. 2",ylab="C.P.3")
text(cor_vc[,2:3],labels=rownames(cor_vc),
     col="red",cex=0.6)
abline(h=0,v=0,lty=1,col="blue")
abline(v=0.5,lty=2)
abline(v=-0.5,lty=2)
abline(h=-0.5,lty=2)
```



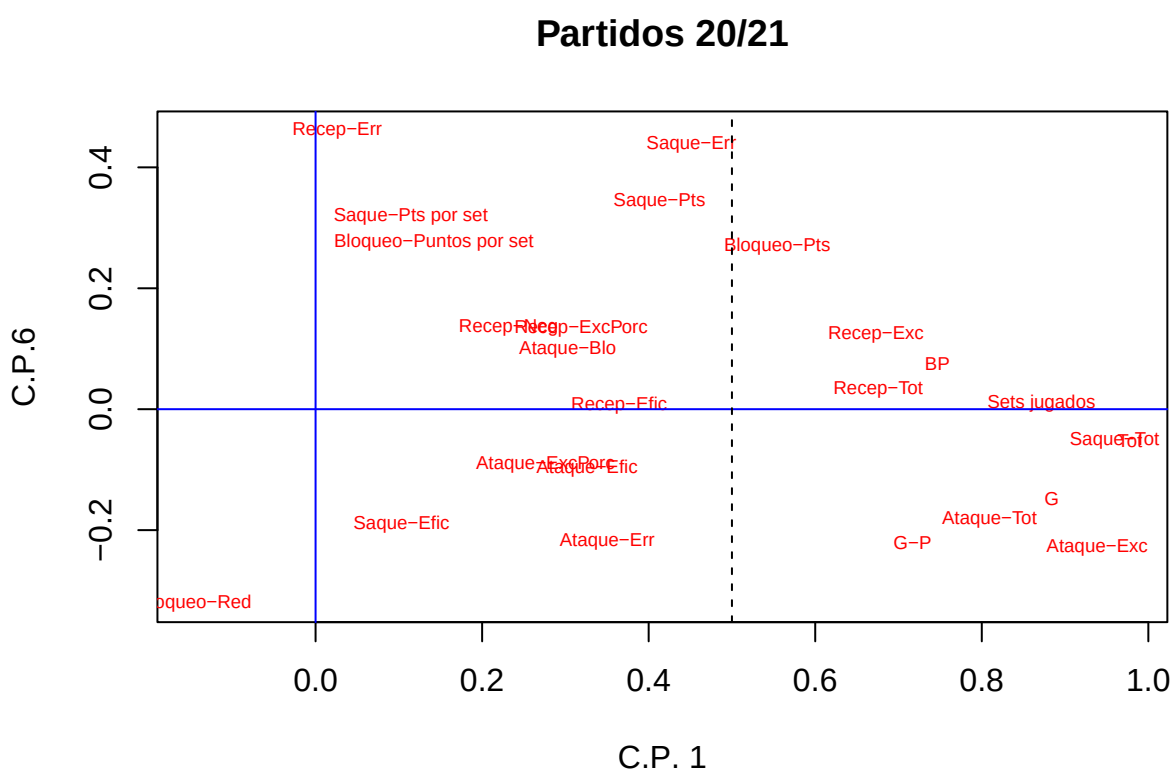
Podemos observar que la tercera componente principal se centra en la recepción y distingue en si la recepción es buena o no y de manera inversa para el ataque. La segunda c.p ...

```
#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)
```



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 20
##    Equipo         `Sets jugados`   Tot    BP     G `G-P` `Saque-Tot` `Saque-Pts`
##    <chr>                   <dbl> <dbl> <dbl> <dbl> <dbl>       <dbl>       <dbl>
##  1 Cajasol Juvasa              3    48    15    33    19          62           2
##  2 AD Algar Surm~              5    81    31    50    39         107           4
##  3 AD Algar Surm~              5    68    28    40    31         108           4
##  4 AD Algar Surm~              4    66    19    47    30          96           5
```

```
##  5 AD Algar Surm~              4    56    16    40    12          80           4
##  6 AD Algar Surm~              4    66    26    40    26          89           7
##  7 AD Algar Surm~              4    61    25    36    15          86           2
##  8 AD Algar Surm~              3    35     9    26    13          56           4
##  9 Arenal Emevé                3    40    14    26     5          67           3
## 10 Arenal Emevé                5    84    29    55    48         101           6
## # ... with 12 more variables: Saque-Err <dbl>, 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[,2:20])
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
##   Perdido    Ganado
## 0.4972973 0.5027027
##
## Conditional probabilities:
##          Sets jugados
## Y             [,1]      [,2]
##   Perdido 3.782609 0.7959525
##   Ganado  3.795699 0.8413129
##
##          Tot
## Y             [,1]     [,2]
##   Perdido 53.57609 15.36818
##   Ganado  66.02151 11.20654
##
##          BP
## Y             [,1]     [,2]
##   Perdido 19.45652 7.319120
##   Ganado  30.03226 5.057177
##
##          G
## Y             [,1]     [,2]
##   Perdido 34.11957 9.402878
##   Ganado  35.98925 9.313962
##
##          G-P
## Y             [,1]      [,2]
##   Perdido 16.16304 12.453233
```

```
##   Ganado  36.02151  6.509155
##
##          Saque-Tot
## Y             [,1]     [,2]
##   Perdido 75.55435 19.39489
##   Ganado  88.76344 15.00246
##
##          Saque-Pts
## Y             [,1]     [,2]
##   Perdido 3.782609 2.479924
##   Ganado  5.752688 2.958613
##
##          Saque-Err
## Y             [,1]     [,2]
##   Perdido 9.076087 3.641138
##   Ganado  8.752688 3.963573
##
##          Recep-Tot
## Y             [,1]     [,2]
##   Perdido 79.77174 13.63101
##   Ganado  66.79570 18.54639
##
##          Recep-Err
## Y             [,1]     [,2]
##   Perdido 5.619565 2.732959
##   Ganado  3.537634 2.139480
##
##          Recep-Neg
## Y             [,1]     [,2]
##   Perdido 23.90217 8.180733
##   Ganado  17.52688 7.033447
##
##          Recep-Exc
## Y             [,1]     [,2]
##   Perdido 29.67391 11.77174
##   Ganado  28.51613 11.87856
##
##          Ataque-Tot
## Y             [,1]     [,2]
##   Perdido 129.4348 29.67676
##   Ganado  127.2581 30.37659
##
##          Ataque-Err
## Y             [,1]     [,2]
##   Perdido 12.50000 4.351329
##   Ganado  10.04301 4.216721
##
##          Ataque-Blo
## Y              [,1]     [,2]
##   Perdido 10.217391 3.893715
##   Ganado   7.677419 3.284222
##
##          Ataque-Exc
## Y             [,1]     [,2]
```

```
##   Perdido 41.78261 11.99526
##   Ganado  50.22581 10.23541
##
##          Bloqueo-Red
## Y               [,1]      [,2]
##   Perdido 0.02173913 0.2085144
##   Ganado  0.02150538 0.1458479
##
##          Bloqueo-Pts
## Y             [,1]     [,2]
##   Perdido  8.01087 3.242894
##   Ganado  10.05376 3.981931
```

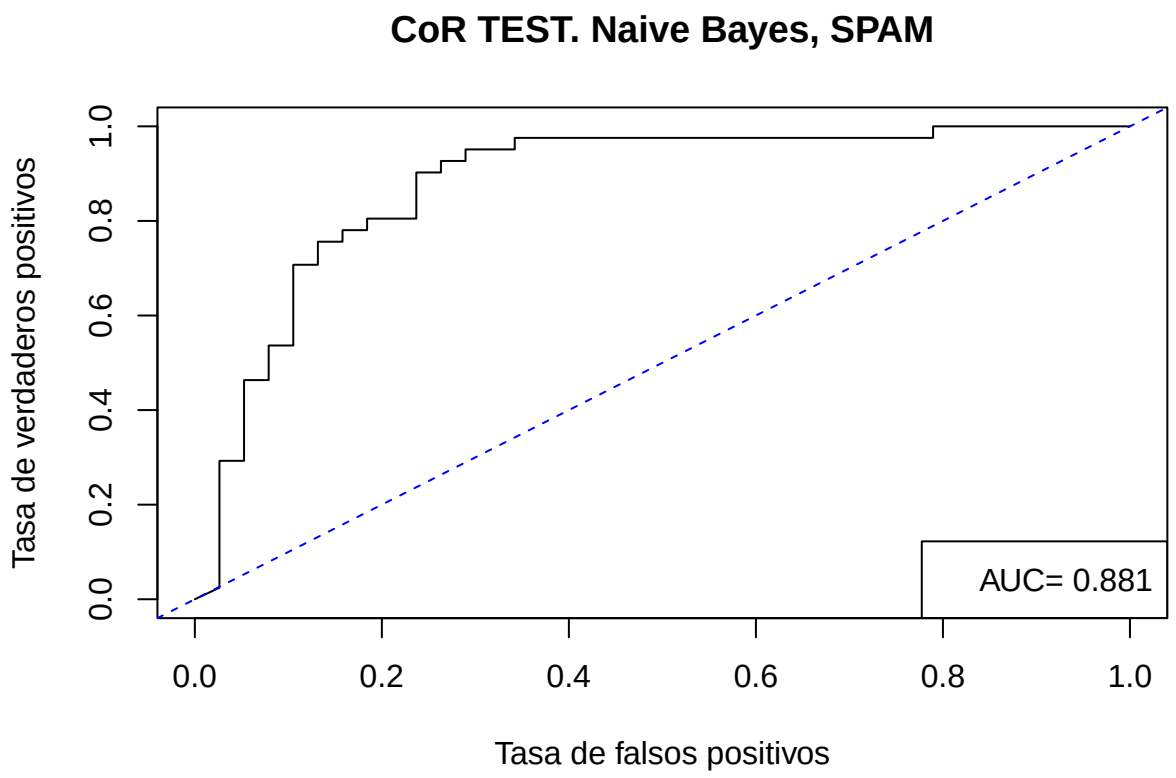
```
preditestNB<- predict(modeloNB,dattest)
confutestNB<-table(dattest$`Ganado/Perdido`,preditestNB)
confutestNB
```

```
##          preditestNB
##           Perdido Ganado
##   Perdido      32      9
##   Ganado        7     31
```

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

```
##         Perdido  Ganado
##   79.75   78.05   81.58
```

```
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    Perdido     Ganado
## 79.7500000  0.8809371 78.0500000 81.5800000
```

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

Otra libreria

```
## naivebayes 0.9.7 loaded
```

```
modeloNB2<- naive_bayes(`Ganado/Perdido` ~ ., data = datent[,2:20],
                        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)
```

```r
#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[,      2:20], usekernel = T
## - Laplace: 0
## - Classes: 2
## - Samples: 185
## - Features: 18
## - Conditional distributions:
##     - KDE: 18
## - Prior probabilities:
##     - Perdido: 0.4973
##     - Ganado: 0.5027
##
## ---------------------------------------------------------------------------------
```

```r
modeloNB2
```

```
##
## ================================== Naive Bayes ==================================
##
##  Call:
## naive_bayes.formula(formula = `Ganado/Perdido` ~ ., data = datent[,
##     2:20], usekernel = TRUE, usepoisson = T, kernel = "epanechnikov",
##     bw = "nrd0")
##
## ---------------------------------------------------------------------------------
##
## Laplace smoothing: 0
##
## ---------------------------------------------------------------------------------
##
##  A priori probabilities:
##
##   Perdido    Ganado
## 0.4972973 0.5027027
##
## ---------------------------------------------------------------------------------
##
##  Tables:
##
```

```
## ------------------------------------------------------------------------------
##  ::: Sets jugados::Perdido (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::Ganado (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
##
## ------------------------------------------------------------------------------
##  ::: Tot::Perdido (KDE)
## ------------------------------------------------------------------------------
##
## Call:
##  density.default(x = x, bw = "nrd0", kernel = "epanechnikov",     na.rm = TRUE)
##
## Data: x (92 obs.);   Bandwidth 'bw' = 5.599
##
##        x                y
##  Min.   :  7.203   Min.   :0.0000000
##  1st Qu.: 31.852   1st Qu.:0.0008947
##  Median : 56.500   Median :0.0104927
##  Mean   : 56.500   Mean   :0.0101332
##  3rd Qu.: 81.148   3rd Qu.:0.0178697
##  Max.   :105.797   Max.   :0.0218710
##
## ------------------------------------------------------------------------------
##  ::: Tot::Ganado (KDE)
## ------------------------------------------------------------------------------
```

```
##
## Call:
##  density.default(x = x, bw = "nrd0", kernel = "epanechnikov",     na.rm = TRUE)
##
## Data: x (93 obs.);   Bandwidth 'bw' = 4.074
##
##        x                y
##  Min.   : 35.78   Min.   :0.000000
##  1st Qu.: 52.14   1st Qu.:0.002436
##  Median : 68.50   Median :0.017756
##  Mean   : 68.50   Mean   :0.015266
##  3rd Qu.: 84.86   3rd Qu.:0.024548
##  Max.   :101.22   Max.   :0.031629
##
## ------------------------------------------------------------------------------
##  ::: BP::Perdido (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::Ganado (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::Perdido (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::Ganado (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
##
## ------------------------------------------------------------------------------
##  ::: G-P::Perdido (KDE)
## ------------------------------------------------------------------------------
##
## Call:
##  density.default(x = x, bw = "nrd0", kernel = "epanechnikov",     na.rm = TRUE)
##
## Data: x (92 obs.);   Bandwidth 'bw' = 4.537
##
##        x                 y
##  Min.   :-23.611   Min.   :0.000000
##  1st Qu.: -4.555   1st Qu.:0.002379
##  Median : 14.500   Median :0.014250
##  Mean   : 14.500   Mean   :0.013106
##  3rd Qu.: 33.555   3rd Qu.:0.022654
##  Max.   : 52.611   Max.   :0.027034
##
## ------------------------------------------------------------------------------
##  ::: G-P::Ganado (KDE)
## ------------------------------------------------------------------------------
##
## Call:
##  density.default(x = x, bw = "nrd0", kernel = "epanechnikov",     na.rm = TRUE)
##
## Data: x (93 obs.);   Bandwidth 'bw' = 2.366
##
```

```
##        x               y
##  Min.   :13.90   Min.   :0.000000
##  1st Qu.:26.45   1st Qu.:0.002368
##  Median :39.00   Median :0.009701
##  Mean   :39.00   Mean   :0.019901
##  3rd Qu.:51.55   3rd Qu.:0.036473
##  Max.   :64.10   Max.   :0.063703
##
## ------------------------------------------------------------------------------
##
## # ... and 13 more tables
##
## ------------------------------------------------------------------------------
```

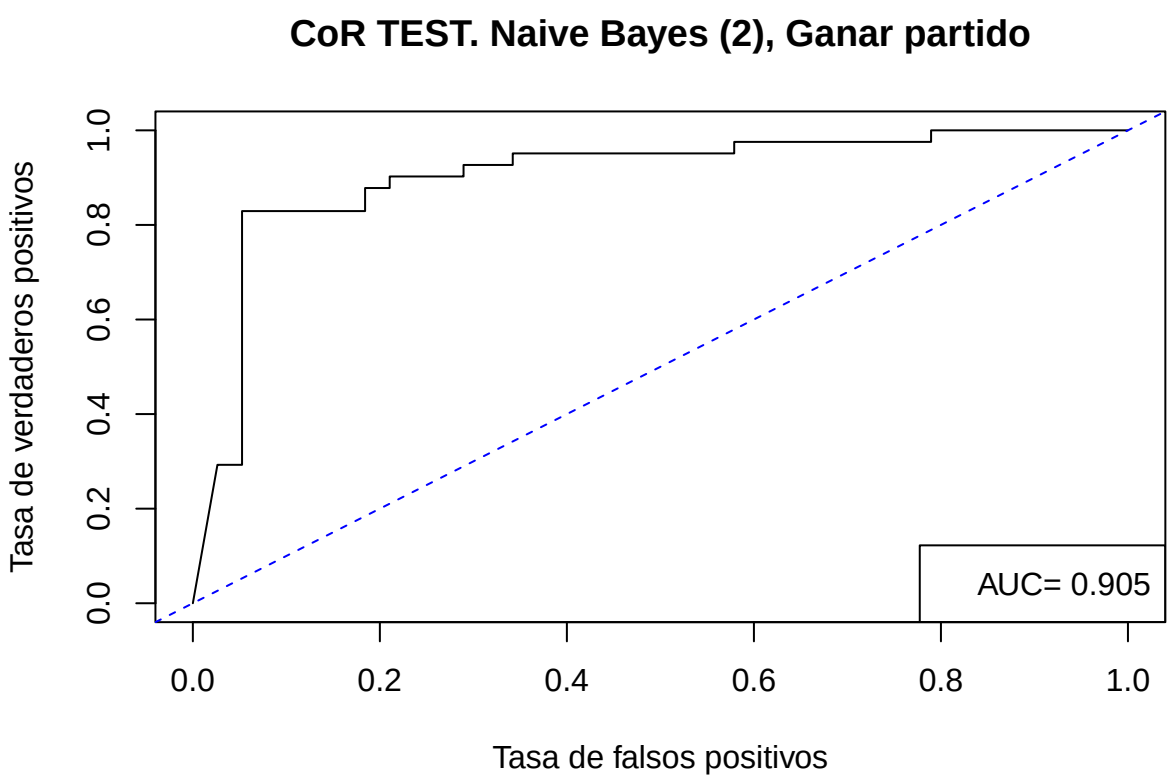
```
#Evaluar el rendimiento
preditestNB2<- predict(modeloNB2,dattest[,2:19])
confutestNB2<-table(dattest$`Ganado/Perdido`,preditestNB2)
confutestNB2
```

```
##          preditestNB2
##           Perdido Ganado
##   Perdido      33      8
##   Ganado        2     36
```

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

```
##         Perdido  Ganado
##   87.34   80.49   94.74
```

```
probabi2<- predict(modeloNB2,dattest[,2:19],
                   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 Perdido Ganado
## Gauss              79.75 0.8809371   78.05  81.58
## Kernel(Poisson)    87.34 0.9050064   80.49  94.74
```

Análisis discriminante lineal

```
library(MASS)
```

```
##
## Attaching package: 'MASS'
```

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

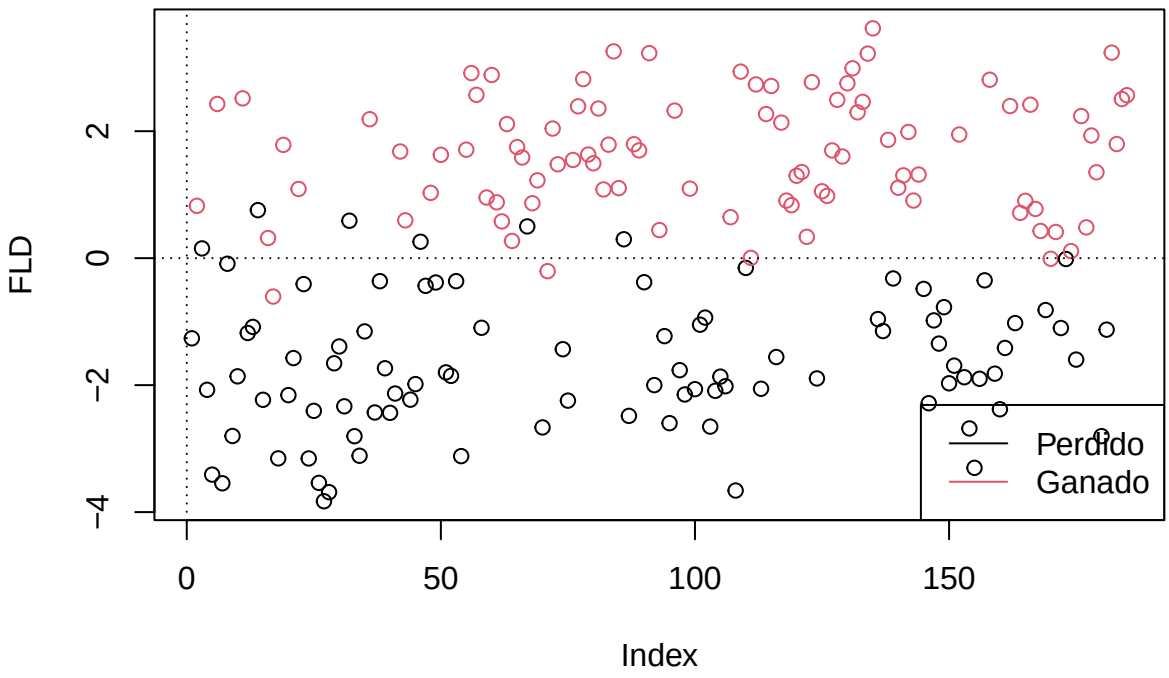
```
modeloLDA = lda(`Ganado/Perdido` ~. , datent[,2:20])
```

```
## Warning in lda.default(x, grouping, ...): variables are collinear
```

```
modeloLDA
```

```
## Call:
## lda(`Ganado/Perdido` ~ ., data = datent[, 2:20])
##
## Prior probabilities of groups:
##   Perdido    Ganado
## 0.4972973 0.5027027
##
## Group means:
##         `Sets jugados`      Tot       BP        G    `G-P` `Saque-Tot`
## Perdido       3.782609 53.57609 19.45652 34.11957 16.16304    75.55435
## Ganado        3.795699 66.02151 30.03226 35.98925 36.02151    88.76344
##         `Saque-Pts` `Saque-Err` `Recep-Tot` `Recep-Err` `Recep-Neg` `Recep-Exc`
## Perdido    3.782609    9.076087    79.77174    5.619565    23.90217    29.67391
## Ganado     5.752688    8.752688    66.79570    3.537634    17.52688    28.51613
##         `Ataque-Tot` `Ataque-Err` `Ataque-Blo` `Ataque-Exc` `Bloqueo-Red`
## Perdido     129.4348     12.50000    10.217391     41.78261    0.02173913
## Ganado      127.2581     10.04301     7.677419     50.22581    0.02150538
##         `Bloqueo-Pts`
## Perdido       8.01087
## Ganado       10.05376
##
## Coefficients of linear discriminants:
##                            LD1
## `Sets jugados` -0.1624060263
## Tot            -0.2365864966
## BP             -0.3339451363
## G              -0.3372298400
## `G-P`           0.3343200942
## `Saque-Tot`     0.0509286735
## `Saque-Pts`     0.2545169074
## `Saque-Err`     0.2948351630
## `Recep-Tot`    -0.1223139593
## `Recep-Err`     0.3704023028
## `Recep-Neg`     0.0137943405
## `Recep-Exc`     0.0012455588
## `Ataque-Tot`   -0.0008060736
## `Ataque-Err`    0.3445506731
## `Ataque-Blo`    0.2990457978
## `Ataque-Exc`    0.3534357611
## `Bloqueo-Red`   0.5561707486
## `Bloqueo-Pts`   0.2880270092
```

```
#Coeficientes FLD en cada caso:
FLD=predict(modeloLDA)$x
plot(FLD, col = datent[,20]$`Ganado/Perdido`)
abline(h=0,v=0,lty=3)
legend("bottomright",col=1:2,lty=1,
       legend=levels(datent$`Ganado/Perdido`))
```



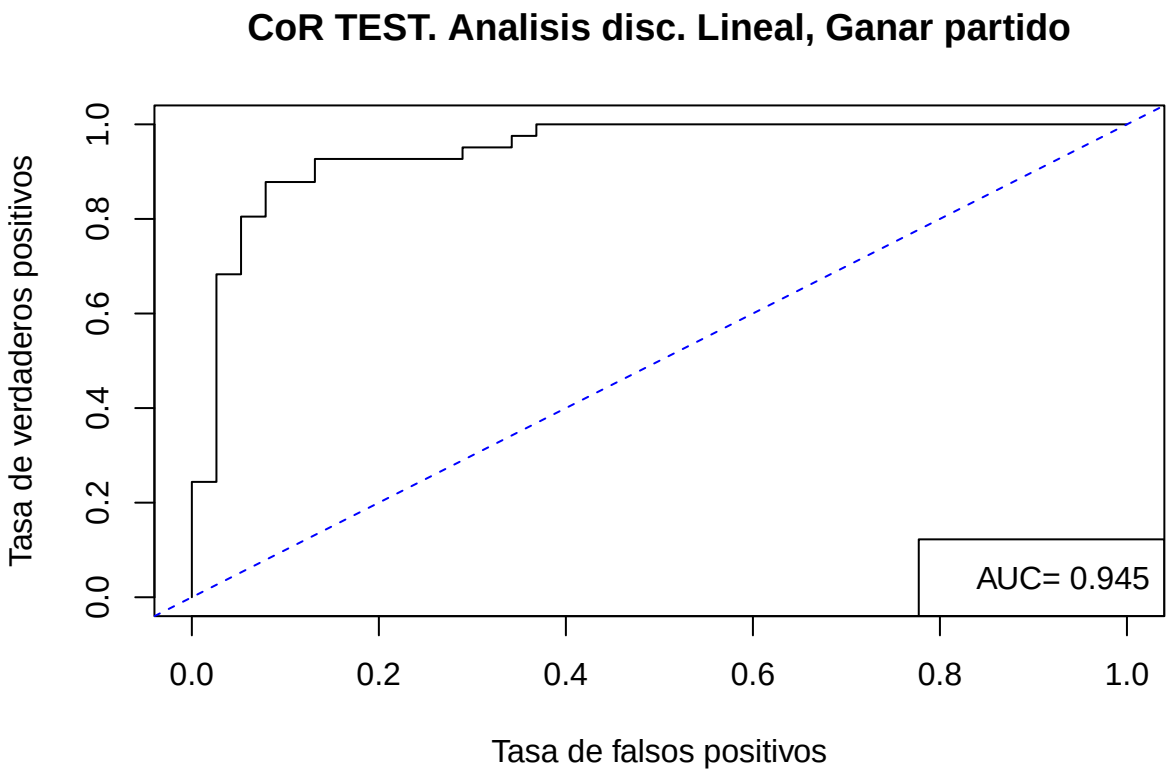

```
preditestLDA=predict(modeloLDA,newdata=dattest[,2:20])$class
confutestLDA=table(Real=dat[inditest,20]$`Ganado/Perdido`,Predic=preditestLDA)
confutestLDA
```

```
##          Predic
## Real      Perdido Ganado
##   Perdido      36       5
##   Ganado        4      34
```

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

```
##         Perdido  Ganado
##   88.61   87.80   89.47
```

```
probabiLDA<- predict(modeloLDA,dattest[,2:19],
                  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 Perdido Ganado
## Gauss              79.75 0.8809371   78.05  81.58
## Kernel(Poisson)    87.34 0.9050064   80.49  94.74
## LDA                88.61 0.9454429   87.80  89.47
```

Regresión Logística

```
modeloRL<- glm(`Ganado/Perdido`~.,family=binomial,data=datent[,2:20])
summary(modeloRL)
```

```
##
## Call:
## glm(formula = `Ganado/Perdido` ~ ., family = binomial, data = datent[,
##     2:20])
##
## Deviance Residuals:
##      Min        1Q    Median        3Q       Max
## -1.98077  -0.01117   0.00036   0.05498   2.78602
##
```

```
## Coefficients: (2 not defined because of singularities)
##                   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
## Tot            -9.408e+00  2.400e+03  -0.004  0.99687
## BP              1.380e-02  1.710e-01   0.081  0.93567
## G                      NA         NA      NA       NA
## `G-P`           9.541e+00  2.400e+03   0.004  0.99683
## `Saque-Tot`     3.356e-01  1.608e-01   2.087  0.03686 *
## `Saque-Pts`    -1.205e-01  2.021e-01  -0.596  0.55111
## `Saque-Err`     9.449e+00  2.400e+03   0.004  0.99686
## `Recep-Tot`    -5.152e-01  1.988e-01  -2.592  0.00955 **
## `Recep-Err`     9.434e+00  2.400e+03   0.004  0.99686
## `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`    9.472e+00  2.400e+03   0.004  0.99685
## `Ataque-Blo`    9.227e+00  2.400e+03   0.004  0.99693
## `Ataque-Exc`    2.282e-01  1.696e-01   1.345  0.17851
## `Bloqueo-Red`   4.326e+00  2.308e+01   0.187  0.85132
## `Bloqueo-Pts`          NA         NA      NA       NA
## ---
## 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%, luego este modelo no nos valdría.

```
# 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 0.8928, luego podemos concluir que el modelo proporciona un buen ajuste.
```

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 = TRUE)

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)))
```

```
## + Fold01: size= 1, decay=0.00
## # weights:  21
## initial  value 116.197966
## iter  10 value 22.743279
## iter  20 value 19.211321
## iter  30 value 19.194738
## final  value 19.194680
## converged
## - Fold01: size= 1, decay=0.00
## + Fold01: size= 2, decay=0.00
## # weights:  41
## initial  value 124.990377
## iter  10 value 37.814013
```

```
## iter  20 value 20.665605
## iter  30 value 13.400087
## iter  40 value 11.497800
## iter  50 value 10.931303
## iter  60 value 9.910695
## iter  70 value 8.233035
## iter  80 value 3.797329
## iter  90 value 2.296627
## iter 100 value 2.263527
## final  value 2.263527
## stopped after 100 iterations
## - Fold01: size= 2, decay=0.00
## + Fold01: size= 3, decay=0.00
## # weights:  61
## initial  value 121.427789
## iter  10 value 31.713217
## iter  20 value 18.999317
## iter  30 value 16.927060
## iter  40 value 13.471969
## iter  50 value 12.377273
## iter  60 value 11.944728
## iter  70 value 11.642948
## iter  80 value 11.124020
## iter  90 value 9.417453
## iter 100 value 9.394892
## final  value 9.394892
## stopped after 100 iterations
## - Fold01: size= 3, decay=0.00
## + Fold01: size= 4, decay=0.00
## # weights:  81
## initial  value 118.156324
## iter  10 value 20.586564
## iter  20 value 8.359370
## iter  30 value 2.897893
## iter  40 value 2.288205
## iter  50 value 2.256228
## iter  60 value 2.250764
## iter  70 value 2.249894
## iter  80 value 2.249389
## iter  90 value 2.249357
## iter 100 value 2.249355
## final  value 2.249355
## stopped after 100 iterations
## - Fold01: size= 4, decay=0.00
## + Fold01: size= 5, decay=0.00
## # weights:  101
## initial  value 132.504491
## iter  10 value 15.936161
## iter  20 value 4.264359
## iter  30 value 1.971784
## iter  40 value 1.915665
## iter  50 value 1.911274
## iter  60 value 1.909572
## final  value 1.909543
```

```
## converged
## - Fold01: size= 5, decay=0.00
## + Fold01: size= 6, decay=0.00
## # weights:  121
## initial  value 131.575114
## iter  10 value 15.660839
## iter  20 value 6.392495
## iter  30 value 4.466087
## iter  40 value 0.563409
## iter  50 value 0.027573
## iter  60 value 0.015525
## iter  70 value 0.006288
## iter  80 value 0.003880
## iter  90 value 0.001965
## iter 100 value 0.001762
## final  value 0.001762
## stopped after 100 iterations
## - Fold01: size= 6, decay=0.00
## + Fold01: size= 7, decay=0.00
## # weights:  141
## initial  value 125.687662
## iter  10 value 14.476637
## iter  20 value 0.813222
## iter  30 value 0.016434
## iter  40 value 0.000842
## iter  50 value 0.000258
## final  value 0.000086
## converged
## - Fold01: size= 7, decay=0.00
## + Fold01: size= 8, decay=0.00
## # weights:  161
## initial  value 131.385806
## iter  10 value 13.410678
## iter  20 value 0.512957
## iter  30 value 0.006966
## iter  40 value 0.000711
## iter  50 value 0.000137
## final  value 0.000095
## converged
## - Fold01: size= 8, decay=0.00
## + Fold01: size= 9, decay=0.00
## # weights:  181
## initial  value 141.420185
## iter  10 value 7.297672
## iter  20 value 0.160277
## iter  30 value 0.002265
## iter  40 value 0.000202
## final  value 0.000096
## converged
## - Fold01: size= 9, decay=0.00
## + Fold01: size=10, decay=0.00
## # weights:  201
## initial  value 125.847400
## iter  10 value 14.782199
```

```
## iter  20 value 0.884980
## iter  30 value 0.035274
## iter  40 value 0.005695
## iter  50 value 0.002725
## iter  60 value 0.001079
## iter  70 value 0.000393
## iter  80 value 0.000173
## iter  90 value 0.000151
## final  value 0.000099
## converged
## - Fold01: size=10, decay=0.00
## + Fold01: size=11, decay=0.00
## # weights:  221
## initial  value 123.188471
## iter  10 value 11.701895
## iter  20 value 0.125055
## iter  30 value 0.001309
## iter  40 value 0.000488
## iter  50 value 0.000149
## final  value 0.000098
## converged
## - Fold01: size=11, decay=0.00
## + Fold01: size=12, decay=0.00
## # weights:  241
## initial  value 124.364951
## iter  10 value 9.052158
## iter  20 value 0.193362
## iter  30 value 0.003625
## iter  40 value 0.000216
## final  value 0.000095
## converged
## - Fold01: size=12, decay=0.00
## + Fold01: size=13, decay=0.00
## # weights:  261
## initial  value 111.885573
## iter  10 value 8.805282
## iter  20 value 0.095062
## iter  30 value 0.002562
## iter  40 value 0.000238
## final  value 0.000089
## converged
## - Fold01: size=13, decay=0.00
## + Fold01: size=14, decay=0.00
## # weights:  281
## initial  value 153.513453
## iter  10 value 10.082191
## iter  20 value 0.127094
## iter  30 value 0.006199
## iter  40 value 0.000898
## iter  50 value 0.000145
## final  value 0.000082
## converged
## - Fold01: size=14, decay=0.00
## + Fold01: size=15, decay=0.00
```

```
## # weights:  301
## initial  value 119.180545
## iter  10 value 9.203290
## iter  20 value 0.213719
## iter  30 value 0.011124
## iter  40 value 0.001987
## final  value 0.000097
## converged
## - Fold01: size=15, decay=0.00
## + Fold01: size=16, decay=0.00
## # weights:  321
## initial  value 123.893841
## iter  10 value 10.747657
## iter  20 value 0.341140
## iter  30 value 0.012719
## iter  40 value 0.001266
## iter  50 value 0.000156
## final  value 0.000098
## converged
## - Fold01: size=16, decay=0.00
## + Fold01: size=17, decay=0.00
## # weights:  341
## initial  value 121.264355
## iter  10 value 9.030000
## iter  20 value 0.196052
## iter  30 value 0.002384
## iter  40 value 0.000247
## iter  50 value 0.000140
## final  value 0.000074
## converged
## - Fold01: size=17, decay=0.00
## + Fold01: size=18, decay=0.00
## # weights:  361
## initial  value 118.190186
## iter  10 value 8.374061
## iter  20 value 0.046084
## iter  30 value 0.000679
## final  value 0.000077
## converged
## - Fold01: size=18, decay=0.00
## + Fold01: size=19, decay=0.00
## # weights:  381
## initial  value 156.501136
## iter  10 value 9.215238
## iter  20 value 0.263677
## iter  30 value 0.010143
## iter  40 value 0.001094
## iter  50 value 0.000206
## final  value 0.000072
## converged
## - Fold01: size=19, decay=0.00
## + Fold01: size=20, decay=0.00
## # weights:  401
## initial  value 150.482144
```

```
## iter  10 value 9.724549
## iter  20 value 0.143544
## iter  30 value 0.004379
## iter  40 value 0.001098
## iter  50 value 0.000230
## iter  60 value 0.000157
## final  value 0.000099
## converged
## - Fold01: size=20, decay=0.00
## + Fold01: size= 1, decay=0.05
## # weights:  21
## initial  value 117.772322
## iter  10 value 25.297493
## iter  20 value 19.574646
## iter  30 value 19.354484
## iter  40 value 19.350910
## iter  40 value 19.350910
## iter  40 value 19.350910
## final  value 19.350910
## converged
## - Fold01: size= 1, decay=0.05
## + Fold01: size= 2, decay=0.05
## # weights:  41
## initial  value 121.206216
## iter  10 value 36.464462
## iter  20 value 19.868038
## iter  30 value 16.441380
## iter  40 value 15.742952
## iter  50 value 15.514488
## iter  60 value 15.504772
## final  value 15.504767
## converged
## - Fold01: size= 2, decay=0.05
## + Fold01: size= 3, decay=0.05
## # weights:  61
## initial  value 140.184351
## iter  10 value 27.406512
## iter  20 value 16.522116
## iter  30 value 14.018491
## iter  40 value 13.542477
## iter  50 value 13.416919
## iter  60 value 13.415345
## iter  70 value 13.415320
## final  value 13.415319
## converged
## - Fold01: size= 3, decay=0.05
## + Fold01: size= 4, decay=0.05
## # weights:  81
## initial  value 125.544222
## iter  10 value 20.496111
## iter  20 value 15.551898
## iter  30 value 14.117027
## iter  40 value 13.677401
## iter  50 value 13.288071
```

```
## iter  60 value 13.128153
## iter  70 value 13.039174
## iter  80 value 13.034427
## iter  90 value 13.029979
## iter 100 value 13.018585
## final  value 13.018585
## stopped after 100 iterations
## - Fold01: size= 4, decay=0.05
## + Fold01: size= 5, decay=0.05
## # weights:  101
## initial  value 137.355670
## iter  10 value 20.992487
## iter  20 value 13.681075
## iter  30 value 12.968949
## iter  40 value 12.622481
## iter  50 value 12.304981
## iter  60 value 11.958965
## iter  70 value 11.932675
## iter  80 value 11.931627
## iter  90 value 11.931452
## final  value 11.931449
## converged
## - Fold01: size= 5, decay=0.05
## + Fold01: size= 6, decay=0.05
## # weights:  121
## initial  value 135.145258
## iter  10 value 20.263759
## iter  20 value 14.174368
## iter  30 value 11.825885
## iter  40 value 11.516535
## iter  50 value 11.484024
## iter  60 value 11.476870
## iter  70 value 11.467605
## iter  80 value 11.463264
## iter  90 value 11.461004
## iter 100 value 11.460904
## final  value 11.460904
## stopped after 100 iterations
## - Fold01: size= 6, decay=0.05
## + Fold01: size= 7, decay=0.05
## # weights:  141
## initial  value 116.872337
## iter  10 value 19.925190
## iter  20 value 12.640511
## iter  30 value 11.900021
## iter  40 value 11.668148
## iter  50 value 11.485434
## iter  60 value 11.310196
## iter  70 value 11.289942
## iter  80 value 11.272390
## iter  90 value 11.162687
## iter 100 value 11.142100
## final  value 11.142100
## stopped after 100 iterations
```

```
## - Fold01: size= 7, decay=0.05
## + Fold01: size= 8, decay=0.05
## # weights:  161
## initial  value 117.654880
## iter  10 value 18.122182
## iter  20 value 12.598273
## iter  30 value 11.700314
## iter  40 value 11.340216
## iter  50 value 11.314540
## iter  60 value 11.302645
## iter  70 value 11.301124
## iter  80 value 11.300752
## iter  90 value 11.300703
## iter 100 value 11.300696
## final  value 11.300696
## stopped after 100 iterations
## - Fold01: size= 8, decay=0.05
## + Fold01: size= 9, decay=0.05
## # weights:  181
## initial  value 132.206151
## iter  10 value 39.157053
## iter  20 value 14.250803
## iter  30 value 11.674131
## iter  40 value 11.156410
## iter  50 value 10.996364
## iter  60 value 10.930733
## iter  70 value 10.905234
## iter  80 value 10.902866
## iter  90 value 10.902124
## iter 100 value 10.901938
## final  value 10.901938
## stopped after 100 iterations
## - Fold01: size= 9, decay=0.05
## + Fold01: size=10, decay=0.05
## # weights:  201
## initial  value 165.305631
## iter  10 value 18.203294
## iter  20 value 12.079817
## iter  30 value 11.367479
## iter  40 value 11.229741
## iter  50 value 11.156987
## iter  60 value 11.104916
## iter  70 value 10.978172
## iter  80 value 10.965540
## iter  90 value 10.956307
## iter 100 value 10.953132
## final  value 10.953132
## stopped after 100 iterations
## - Fold01: size=10, decay=0.05
## + Fold01: size=11, decay=0.05
## # weights:  221
## initial  value 151.021994
## iter  10 value 25.047402
## iter  20 value 14.530423
```

```
## iter  30 value 12.423000
## iter  40 value 11.622697
## iter  50 value 11.208119
## iter  60 value 11.026270
## iter  70 value 10.934453
## iter  80 value 10.911240
## iter  90 value 10.898434
## iter 100 value 10.891135
## final  value 10.891135
## stopped after 100 iterations
## - Fold01: size=11, decay=0.05
## + Fold01: size=12, decay=0.05
## # weights:  241
## initial  value 119.507215
## iter  10 value 18.549238
## iter  20 value 12.373289
## iter  30 value 11.519246
## iter  40 value 11.249026
## iter  50 value 11.141284
## iter  60 value 11.084990
## iter  70 value 11.065457
## iter  80 value 11.060446
## iter  90 value 11.059869
## iter 100 value 11.059585
## final  value 11.059585
## stopped after 100 iterations
## - Fold01: size=12, decay=0.05
## + Fold01: size=13, decay=0.05
## # weights:  261
## initial  value 143.398799
## iter  10 value 27.793125
## iter  20 value 13.901899
## iter  30 value 12.140235
## iter  40 value 11.459352
## iter  50 value 11.245018
## iter  60 value 11.082069
## iter  70 value 10.964353
## iter  80 value 10.861364
## iter  90 value 10.834549
## iter 100 value 10.825991
## final  value 10.825991
## stopped after 100 iterations
## - Fold01: size=13, decay=0.05
## + Fold01: size=14, decay=0.05
## # weights:  281
## initial  value 123.862840
## iter  10 value 23.998771
## iter  20 value 13.626393
## iter  30 value 11.544044
## iter  40 value 11.298546
## iter  50 value 11.200208
## iter  60 value 11.029126
## iter  70 value 10.962248
## iter  80 value 10.933913
```

```
## iter  90 value 10.913059
## iter 100 value 10.818895
## final  value 10.818895
## stopped after 100 iterations
## - Fold01: size=14, decay=0.05
## + Fold01: size=15, decay=0.05
## # weights:  301
## initial  value 136.387675
## iter  10 value 25.906778
## iter  20 value 14.268960
## iter  30 value 11.921047
## iter  40 value 11.355587
## iter  50 value 11.249385
## iter  60 value 11.141530
## iter  70 value 10.954691
## iter  80 value 10.885852
## iter  90 value 10.831271
## iter 100 value 10.782461
## final  value 10.782461
## stopped after 100 iterations
## - Fold01: size=15, decay=0.05
## + Fold01: size=16, decay=0.05
## # weights:  321
## initial  value 109.003326
## iter  10 value 16.481273
## iter  20 value 11.637889
## iter  30 value 11.110015
## iter  40 value 10.861955
## iter  50 value 10.782885
## iter  60 value 10.735338
## iter  70 value 10.726939
## iter  80 value 10.724170
## iter  90 value 10.722776
## iter 100 value 10.721945
## final  value 10.721945
## stopped after 100 iterations
## - Fold01: size=16, decay=0.05
## + Fold01: size=17, decay=0.05
## # weights:  341
## initial  value 185.324396
## iter  10 value 19.923179
## iter  20 value 13.095916
## iter  30 value 11.585822
## iter  40 value 11.268957
## iter  50 value 11.188439
## iter  60 value 11.131076
## iter  70 value 11.072424
## iter  80 value 11.055367
## iter  90 value 11.046333
## iter 100 value 11.043061
## final  value 11.043061
## stopped after 100 iterations
## - Fold01: size=17, decay=0.05
## + Fold01: size=18, decay=0.05
```

```
## # weights:  361
## initial  value 147.760177
## iter  10 value 17.126346
## iter  20 value 11.800472
## iter  30 value 11.180474
## iter  40 value 10.963858
## iter  50 value 10.864592
## iter  60 value 10.837710
## iter  70 value 10.820611
## iter  80 value 10.797817
## iter  90 value 10.776587
## iter 100 value 10.759461
## final  value 10.759461
## stopped after 100 iterations
## - Fold01: size=18, decay=0.05
## + Fold01: size=19, decay=0.05
## # weights:  381
## initial  value 105.895074
## iter  10 value 30.022956
## iter  20 value 15.337972
## iter  30 value 11.909097
## iter  40 value 11.085554
## iter  50 value 10.898649
## iter  60 value 10.829524
## iter  70 value 10.819918
## iter  80 value 10.818347
## iter  90 value 10.811488
## iter 100 value 10.804605
## final  value 10.804605
## stopped after 100 iterations
## - Fold01: size=19, decay=0.05
## + Fold01: size=20, decay=0.05
## # weights:  401
## initial  value 167.336632
## iter  10 value 17.647843
## iter  20 value 11.890237
## iter  30 value 11.232512
## iter  40 value 11.007259
## iter  50 value 10.882368
## iter  60 value 10.821204
## iter  70 value 10.770041
## iter  80 value 10.761260
## iter  90 value 10.756937
## iter 100 value 10.752656
## final  value 10.752656
## stopped after 100 iterations
## - Fold01: size=20, decay=0.05
## + Fold01: size= 1, decay=0.10
## # weights:  21
## initial  value 115.584177
## iter  10 value 44.591287
## iter  20 value 26.134467
## iter  30 value 25.622115
## final  value 25.621892
```

```
## converged
## - Fold01: size= 1, decay=0.10
## + Fold01: size= 2, decay=0.10
## # weights:  41
## initial  value 120.093130
## iter  10 value 45.267495
## iter  20 value 23.353185
## iter  30 value 21.983867
## iter  40 value 21.498991
## iter  50 value 21.119254
## iter  60 value 20.746940
## iter  70 value 20.395858
## iter  80 value 20.343930
## final  value 20.343907
## converged
## - Fold01: size= 2, decay=0.10
## + Fold01: size= 3, decay=0.10
## # weights:  61
## initial  value 117.706955
## iter  10 value 36.669077
## iter  20 value 25.947705
## iter  30 value 20.985731
## iter  40 value 19.573211
## iter  50 value 19.523809
## iter  60 value 19.523112
## final  value 19.523108
## converged
## - Fold01: size= 3, decay=0.10
## + Fold01: size= 4, decay=0.10
## # weights:  81
## initial  value 128.491159
## iter  10 value 29.257888
## iter  20 value 22.065090
## iter  30 value 20.112097
## iter  40 value 19.499207
## iter  50 value 19.405679
## iter  60 value 19.364097
## iter  70 value 19.353436
## iter  80 value 19.351846
## final  value 19.351837
## converged
## - Fold01: size= 4, decay=0.10
## + Fold01: size= 5, decay=0.10
## # weights:  101
## initial  value 125.577629
## iter  10 value 26.640642
## iter  20 value 19.624025
## iter  30 value 18.665628
## iter  40 value 18.228733
## iter  50 value 18.008507
## iter  60 value 17.954989
## iter  70 value 17.930180
## iter  80 value 17.929291
## iter  90 value 17.929235
```

```
## final  value 17.929235
## converged
## - Fold01: size= 5, decay=0.10
## + Fold01: size= 6, decay=0.10
## # weights:  121
## initial  value 125.261810
## iter  10 value 24.334447
## iter  20 value 18.895471
## iter  30 value 18.292767
## iter  40 value 17.755824
## iter  50 value 17.676609
## iter  60 value 17.667829
## iter  70 value 17.667786
## iter  70 value 17.667786
## iter  70 value 17.667786
## final  value 17.667786
## converged
## - Fold01: size= 6, decay=0.10
## + Fold01: size= 7, decay=0.10
## # weights:  141
## initial  value 133.967564
## iter  10 value 23.390264
## iter  20 value 18.298510
## iter  30 value 17.788210
## iter  40 value 17.703838
## iter  50 value 17.693011
## iter  60 value 17.690579
## iter  70 value 17.689653
## iter  80 value 17.686081
## iter  90 value 17.682096
## final  value 17.682035
## converged
## - Fold01: size= 7, decay=0.10
## + Fold01: size= 8, decay=0.10
## # weights:  161
## initial  value 142.512479
## iter  10 value 28.738386
## iter  20 value 19.739704
## iter  30 value 17.843787
## iter  40 value 17.539598
## iter  50 value 17.487395
## iter  60 value 17.481144
## iter  70 value 17.479721
## iter  80 value 17.479663
## iter  90 value 17.479655
## final  value 17.479648
## converged
## - Fold01: size= 8, decay=0.10
## + Fold01: size= 9, decay=0.10
## # weights:  181
## initial  value 142.177291
## iter  10 value 32.594574
## iter  20 value 19.732987
## iter  30 value 18.166397
```

```
## iter  40 value 17.697276
## iter  50 value 17.479599
## iter  60 value 17.411854
## iter  70 value 17.396114
## iter  80 value 17.378221
## iter  90 value 17.373954
## iter 100 value 17.372695
## final  value 17.372695
## stopped after 100 iterations
## - Fold01: size= 9, decay=0.10
## + Fold01: size=10, decay=0.10
## # weights:  201
## initial  value 131.862606
## iter  10 value 28.719847
## iter  20 value 19.649604
## iter  30 value 17.746334
## iter  40 value 17.487414
## iter  50 value 17.391757
## iter  60 value 17.367209
## iter  70 value 17.270210
## iter  80 value 17.237097
## iter  90 value 17.233197
## iter 100 value 17.232652
## final  value 17.232652
## stopped after 100 iterations
## - Fold01: size=10, decay=0.10
## + Fold01: size=11, decay=0.10
## # weights:  221
## initial  value 128.966939
## iter  10 value 34.089235
## iter  20 value 20.144241
## iter  30 value 18.084475
## iter  40 value 17.648217
## iter  50 value 17.393667
## iter  60 value 17.289604
## iter  70 value 17.232815
## iter  80 value 17.225141
## iter  90 value 17.221149
## iter 100 value 17.206583
## final  value 17.206583
## stopped after 100 iterations
## - Fold01: size=11, decay=0.10
## + Fold01: size=12, decay=0.10
## # weights:  241
## initial  value 135.098867
## iter  10 value 22.688634
## iter  20 value 17.945585
## iter  30 value 17.588950
## iter  40 value 17.465767
## iter  50 value 17.433625
## iter  60 value 17.399202
## iter  70 value 17.345297
## iter  80 value 17.275854
## iter  90 value 17.221338
```

```
## iter 100 value 17.202918
## final  value 17.202918
## stopped after 100 iterations
## - Fold01: size=12, decay=0.10
## + Fold01: size=13, decay=0.10
## # weights:  261
## initial  value 191.910978
## iter  10 value 30.418207
## iter  20 value 19.959933
## iter  30 value 17.844439
## iter  40 value 17.464771
## iter  50 value 17.288400
## iter  60 value 17.226796
## iter  70 value 17.186877
## iter  80 value 17.183121
## iter  90 value 17.182945
## iter 100 value 17.182921
## final  value 17.182921
## stopped after 100 iterations
## - Fold01: size=13, decay=0.10
## + Fold01: size=14, decay=0.10
## # weights:  281
## initial  value 155.585036
## iter  10 value 23.414226
## iter  20 value 18.273175
## iter  30 value 17.507913
## iter  40 value 17.218993
## iter  50 value 17.143807
## iter  60 value 17.116957
## iter  70 value 17.110102
## iter  80 value 17.104996
## iter  90 value 17.104305
## iter 100 value 17.104165
## final  value 17.104165
## stopped after 100 iterations
## - Fold01: size=14, decay=0.10
## + Fold01: size=15, decay=0.10
## # weights:  301
## initial  value 151.818141
## iter  10 value 22.127768
## iter  20 value 17.514390
## iter  30 value 17.200531
## iter  40 value 17.122621
## iter  50 value 17.084120
## iter  60 value 17.053456
## iter  70 value 16.991150
## iter  80 value 16.982005
## iter  90 value 16.980236
## iter 100 value 16.979450
## final  value 16.979450
## stopped after 100 iterations
## - Fold01: size=15, decay=0.10
## + Fold01: size=16, decay=0.10
## # weights:  321
```

```
## initial  value 102.247782
## iter  10 value 22.506034
## iter  20 value 18.246595
## iter  30 value 17.601893
## iter  40 value 17.372869
## iter  50 value 17.256448
## iter  60 value 17.075315
## iter  70 value 17.044651
## iter  80 value 17.041503
## iter  90 value 17.041022
## iter 100 value 17.040889
## final  value 17.040889
## stopped after 100 iterations
## - Fold01: size=16, decay=0.10
## + Fold01: size=17, decay=0.10
## # weights:  341
## initial  value 139.753413
## iter  10 value 23.114192
## iter  20 value 18.197627
## iter  30 value 17.492707
## iter  40 value 17.268571
## iter  50 value 17.143005
## iter  60 value 16.992926
## iter  70 value 16.939813
## iter  80 value 16.931541
## iter  90 value 16.920293
## iter 100 value 16.919475
## final  value 16.919475
## stopped after 100 iterations
## - Fold01: size=17, decay=0.10
## + Fold01: size=18, decay=0.10
## # weights:  361
## initial  value 152.840101
## iter  10 value 24.533687
## iter  20 value 17.976639
## iter  30 value 17.324666
## iter  40 value 17.141424
## iter  50 value 17.055265
## iter  60 value 17.030703
## iter  70 value 16.960309
## iter  80 value 16.916036
## iter  90 value 16.911999
## iter 100 value 16.910359
## final  value 16.910359
## stopped after 100 iterations
## - Fold01: size=18, decay=0.10
## + Fold01: size=19, decay=0.10
## # weights:  381
## initial  value 117.328733
## iter  10 value 33.288741
## iter  20 value 19.319543
## iter  30 value 17.738565
## iter  40 value 17.401396
## iter  50 value 17.220209
```

```
## iter  60 value 17.171138
## iter  70 value 17.142740
## iter  80 value 17.126311
## iter  90 value 17.120549
## iter 100 value 17.119623
## final  value 17.119623
## stopped after 100 iterations
## - Fold01: size=19, decay=0.10
## + Fold01: size=20, decay=0.10
## # weights:  401
## initial  value 144.557087
## iter  10 value 23.077072
## iter  20 value 17.958719
## iter  30 value 17.530377
## iter  40 value 17.281480
## iter  50 value 17.166471
## iter  60 value 17.128602
## iter  70 value 17.096912
## iter  80 value 17.090411
## iter  90 value 17.089395
## iter 100 value 17.088929
## final  value 17.088929
## stopped after 100 iterations
## - Fold01: size=20, decay=0.10
## + Fold02: size= 1, decay=0.00
## # weights:  21
## initial  value 121.541474
## iter  10 value 28.386755
## iter  20 value 13.429581
## iter  30 value 13.241855
## iter  40 value 12.961706
## iter  50 value 12.348936
## iter  60 value 9.501436
## iter  70 value 5.433580
## iter  80 value 5.412821
## final  value 5.412792
## converged
## - Fold02: size= 1, decay=0.00
## + Fold02: size= 2, decay=0.00
## # weights:  41
## initial  value 114.680839
## iter  10 value 34.820943
## iter  20 value 14.674291
## iter  30 value 13.320465
## iter  40 value 12.594183
## iter  50 value 12.469967
## iter  60 value 12.465766
## iter  70 value 12.465594
## final  value 12.465500
## converged
## - Fold02: size= 2, decay=0.00
## + Fold02: size= 3, decay=0.00
## # weights:  61
## initial  value 113.228795
```

```
## iter  10 value 23.755755
## iter  20 value 16.387455
## iter  30 value 8.153128
## iter  40 value 5.347542
## iter  50 value 4.521445
## iter  60 value 4.501159
## iter  70 value 4.499441
## iter  80 value 4.498995
## iter  90 value 4.498160
## iter 100 value 4.496967
## final  value 4.496967
## stopped after 100 iterations
## - Fold02: size= 3, decay=0.00
## + Fold02: size= 4, decay=0.00
## # weights:  81
## initial  value 125.074048
## iter  10 value 20.147312
## iter  20 value 7.265097
## iter  30 value 4.235741
## iter  40 value 4.164752
## iter  50 value 4.159893
## iter  60 value 4.159073
## iter  70 value 4.158957
## iter  80 value 4.158891
## final  value 4.158887
## converged
## - Fold02: size= 4, decay=0.00
## + Fold02: size= 5, decay=0.00
## # weights:  101
## initial  value 124.026046
## iter  10 value 12.978881
## iter  20 value 1.962994
## iter  30 value 1.399706
## iter  40 value 1.387041
## iter  50 value 1.386377
## iter  60 value 1.386355
## iter  70 value 1.386295
## final  value 1.386294
## converged
## - Fold02: size= 5, decay=0.00
## + Fold02: size= 6, decay=0.00
## # weights:  121
## initial  value 103.043277
## iter  10 value 12.986938
## iter  20 value 3.127047
## iter  30 value 0.022888
## final  value 0.000090
## converged
## - Fold02: size= 6, decay=0.00
## + Fold02: size= 7, decay=0.00
## # weights:  141
## initial  value 109.874408
## iter  10 value 13.422527
## iter  20 value 2.385387
```

```
## iter  30 value 0.042605
## iter  40 value 0.000422
## iter  50 value 0.000136
## iter  50 value 0.000077
## iter  50 value 0.000077
## final  value 0.000077
## converged
## - Fold02: size= 7, decay=0.00
## + Fold02: size= 8, decay=0.00
## # weights:  161
## initial  value 109.252630
## iter  10 value 14.119642
## iter  20 value 2.110322
## iter  30 value 0.007829
## iter  40 value 0.000230
## iter  50 value 0.000102
## iter  50 value 0.000081
## iter  50 value 0.000081
## final  value 0.000081
## converged
## - Fold02: size= 8, decay=0.00
## + Fold02: size= 9, decay=0.00
## # weights:  181
## initial  value 186.014302
## iter  10 value 10.784917
## iter  20 value 0.261913
## iter  30 value 0.002291
## final  value 0.000081
## converged
## - Fold02: size= 9, decay=0.00
## + Fold02: size=10, decay=0.00
## # weights:  201
## initial  value 129.296203
## iter  10 value 15.382915
## iter  20 value 1.550297
## iter  30 value 0.013814
## iter  40 value 0.000385
## final  value 0.000078
## converged
## - Fold02: size=10, decay=0.00
## + Fold02: size=11, decay=0.00
## # weights:  221
## initial  value 117.873540
## iter  10 value 11.968217
## iter  20 value 0.396538
## iter  30 value 0.015172
## iter  40 value 0.000210
## final  value 0.000088
## converged
## - Fold02: size=11, decay=0.00
## + Fold02: size=12, decay=0.00
## # weights:  241
## initial  value 136.435444
## iter  10 value 12.070674
```

```
## iter  20 value 0.523011
## iter  30 value 0.005718
## iter  40 value 0.000515
## final  value 0.000076
## converged
## - Fold02: size=12, decay=0.00
## + Fold02: size=13, decay=0.00
## # weights:  261
## initial  value 110.643791
## iter  10 value 10.584412
## iter  20 value 0.427899
## iter  30 value 0.005711
## final  value 0.000060
## converged
## - Fold02: size=13, decay=0.00
## + Fold02: size=14, decay=0.00
## # weights:  281
## initial  value 116.203758
## iter  10 value 12.880214
## iter  20 value 0.298051
## iter  30 value 0.002560
## final  value 0.000075
## converged
## - Fold02: size=14, decay=0.00
## + Fold02: size=15, decay=0.00
## # weights:  301
## initial  value 155.286044
## iter  10 value 12.812908
## iter  20 value 0.575685
## iter  30 value 0.013199
## iter  40 value 0.000269
## final  value 0.000069
## converged
## - Fold02: size=15, decay=0.00
## + Fold02: size=16, decay=0.00
## # weights:  321
## initial  value 123.792301
## iter  10 value 13.276190
## iter  20 value 0.279091
## iter  30 value 0.006201
## iter  40 value 0.000528
## final  value 0.000094
## converged
## - Fold02: size=16, decay=0.00
## + Fold02: size=17, decay=0.00
## # weights:  341
## initial  value 120.171445
## iter  10 value 11.208953
## iter  20 value 0.221930
## iter  30 value 0.004019
## final  value 0.000061
## converged
## - Fold02: size=17, decay=0.00
## + Fold02: size=18, decay=0.00
```

```
## # weights:  361
## initial  value 126.477174
## iter  10 value 12.421276
## iter  20 value 0.598034
## iter  30 value 0.002252
## iter  40 value 0.000323
## final  value 0.000062
## converged
## - Fold02: size=18, decay=0.00
## + Fold02: size=19, decay=0.00
## # weights:  381
## initial  value 130.939925
## iter  10 value 10.220600
## iter  20 value 0.351391
## iter  30 value 0.004119
## final  value 0.000062
## converged
## - Fold02: size=19, decay=0.00
## + Fold02: size=20, decay=0.00
## # weights:  401
## initial  value 121.568514
## iter  10 value 11.069743
## iter  20 value 1.212597
## iter  30 value 0.002838
## iter  40 value 0.000228
## final  value 0.000094
## converged
## - Fold02: size=20, decay=0.00
## + Fold02: size= 1, decay=0.05
## # weights:  21
## initial  value 115.555550
## iter  10 value 26.314500
## iter  20 value 23.091479
## iter  30 value 22.840884
## final  value 22.840779
## converged
## - Fold02: size= 1, decay=0.05
## + Fold02: size= 2, decay=0.05
## # weights:  41
## initial  value 112.124081
## iter  10 value 36.890051
## iter  20 value 19.759120
## iter  30 value 18.537963
## iter  40 value 17.915685
## iter  50 value 17.483267
## iter  60 value 17.366287
## iter  70 value 17.336196
## iter  80 value 17.335819
## final  value 17.335817
## converged
## - Fold02: size= 2, decay=0.05
## + Fold02: size= 3, decay=0.05
## # weights:  61
## initial  value 110.536488
```

```
## iter  10 value 23.459771
## iter  20 value 16.728033
## iter  30 value 14.820951
## iter  40 value 14.082514
## iter  50 value 14.059157
## final  value 14.059083
## converged
## - Fold02: size= 3, decay=0.05
## + Fold02: size= 4, decay=0.05
## # weights:  81
## initial  value 124.527675
## iter  10 value 25.759090
## iter  20 value 18.713387
## iter  30 value 17.038169
## iter  40 value 15.143799
## iter  50 value 13.992537
## iter  60 value 13.762801
## iter  70 value 13.685754
## iter  80 value 13.679876
## final  value 13.679848
## converged
## - Fold02: size= 4, decay=0.05
## + Fold02: size= 5, decay=0.05
## # weights:  101
## initial  value 120.533440
## iter  10 value 22.108646
## iter  20 value 15.645674
## iter  30 value 14.576366
## iter  40 value 13.937615
## iter  50 value 13.561238
## iter  60 value 13.159447
## iter  70 value 13.012392
## iter  80 value 12.875208
## iter  90 value 12.862720
## iter 100 value 12.862429
## final  value 12.862429
## stopped after 100 iterations
## - Fold02: size= 5, decay=0.05
## + Fold02: size= 6, decay=0.05
## # weights:  121
## initial  value 123.267473
## iter  10 value 20.032867
## iter  20 value 15.037144
## iter  30 value 13.332876
## iter  40 value 12.961082
## iter  50 value 12.868489
## iter  60 value 12.838483
## iter  70 value 12.833772
## iter  80 value 12.833230
## iter  90 value 12.832983
## final  value 12.832948
## converged
## - Fold02: size= 6, decay=0.05
## + Fold02: size= 7, decay=0.05
```

```
## # weights:  141
## initial  value 109.677289
## iter  10 value 17.812783
## iter  20 value 14.342932
## iter  30 value 13.335188
## iter  40 value 13.012450
## iter  50 value 12.821174
## iter  60 value 12.800164
## iter  70 value 12.798190
## iter  80 value 12.798032
## iter  90 value 12.797998
## iter 100 value 12.797747
## final  value 12.797747
## stopped after 100 iterations
## - Fold02: size= 7, decay=0.05
## + Fold02: size= 8, decay=0.05
## # weights:  161
## initial  value 101.045261
## iter  10 value 29.014929
## iter  20 value 17.826621
## iter  30 value 15.704849
## iter  40 value 14.315950
## iter  50 value 13.444694
## iter  60 value 13.186849
## iter  70 value 12.930619
## iter  80 value 12.852061
## iter  90 value 12.838451
## iter 100 value 12.833301
## final  value 12.833301
## stopped after 100 iterations
## - Fold02: size= 8, decay=0.05
## + Fold02: size= 9, decay=0.05
## # weights:  181
## initial  value 115.510241
## iter  10 value 19.657656
## iter  20 value 14.118529
## iter  30 value 13.170438
## iter  40 value 12.665914
## iter  50 value 12.513110
## iter  60 value 12.344173
## iter  70 value 12.302407
## iter  80 value 12.292694
## iter  90 value 12.288478
## iter 100 value 12.288252
## final  value 12.288252
## stopped after 100 iterations
## - Fold02: size= 9, decay=0.05
## + Fold02: size=10, decay=0.05
## # weights:  201
## initial  value 123.814896
## iter  10 value 21.075015
## iter  20 value 14.765892
## iter  30 value 13.408911
## iter  40 value 12.679384
```

```
## iter  50 value 12.430597
## iter  60 value 12.277852
## iter  70 value 12.220930
## iter  80 value 12.217837
## iter  90 value 12.216841
## iter 100 value 12.216600
## final  value 12.216600
## stopped after 100 iterations
## - Fold02: size=10, decay=0.05
## + Fold02: size=11, decay=0.05
## # weights:  221
## initial  value 130.403606
## iter  10 value 25.570815
## iter  20 value 14.843672
## iter  30 value 13.040208
## iter  40 value 12.517334
## iter  50 value 12.386703
## iter  60 value 12.318120
## iter  70 value 12.222270
## iter  80 value 12.210695
## iter  90 value 12.205398
## iter 100 value 12.199096
## final  value 12.199096
## stopped after 100 iterations
## - Fold02: size=11, decay=0.05
## + Fold02: size=12, decay=0.05
## # weights:  241
## initial  value 127.021160
## iter  10 value 20.005363
## iter  20 value 14.408428
## iter  30 value 13.094219
## iter  40 value 12.641273
## iter  50 value 12.483103
## iter  60 value 12.394370
## iter  70 value 12.243655
## iter  80 value 12.230559
## iter  90 value 12.222958
## iter 100 value 12.217705
## final  value 12.217705
## stopped after 100 iterations
## - Fold02: size=12, decay=0.05
## + Fold02: size=13, decay=0.05
## # weights:  261
## initial  value 118.906792
## iter  10 value 24.883211
## iter  20 value 14.564884
## iter  30 value 12.827087
## iter  40 value 12.384219
## iter  50 value 12.238540
## iter  60 value 12.214716
## iter  70 value 12.201838
## iter  80 value 12.180959
## iter  90 value 12.176378
## iter 100 value 12.174971
```

```
## final  value 12.174971
## stopped after 100 iterations
## - Fold02: size=13, decay=0.05
## + Fold02: size=14, decay=0.05
## # weights:  281
## initial  value 111.042755
## iter  10 value 18.113990
## iter  20 value 13.234931
## iter  30 value 12.532642
## iter  40 value 12.231069
## iter  50 value 12.179200
## iter  60 value 12.160506
## iter  70 value 12.151305
## iter  80 value 12.149346
## iter  90 value 12.148857
## iter 100 value 12.148643
## final  value 12.148643
## stopped after 100 iterations
## - Fold02: size=14, decay=0.05
## + Fold02: size=15, decay=0.05
## # weights:  301
## initial  value 127.026791
## iter  10 value 23.769893
## iter  20 value 15.368345
## iter  30 value 13.073803
## iter  40 value 12.487679
## iter  50 value 12.317477
## iter  60 value 12.202623
## iter  70 value 12.188173
## iter  80 value 12.187010
## iter  90 value 12.186264
## iter 100 value 12.185915
## final  value 12.185915
## stopped after 100 iterations
## - Fold02: size=15, decay=0.05
## + Fold02: size=16, decay=0.05
## # weights:  321
## initial  value 116.638807
## iter  10 value 19.761223
## iter  20 value 13.315770
## iter  30 value 12.500010
## iter  40 value 12.247744
## iter  50 value 12.198334
## iter  60 value 12.191633
## iter  70 value 12.186343
## iter  80 value 12.185652
## iter  90 value 12.184971
## iter 100 value 12.184693
## final  value 12.184693
## stopped after 100 iterations
## - Fold02: size=16, decay=0.05
## + Fold02: size=17, decay=0.05
## # weights:  341
## initial  value 118.476801
```

```
## iter  10 value 19.409041
## iter  20 value 13.427341
## iter  30 value 12.555024
## iter  40 value 12.328883
## iter  50 value 12.242248
## iter  60 value 12.219592
## iter  70 value 12.213642
## iter  80 value 12.203312
## iter  90 value 12.188274
## iter 100 value 12.163868
## final  value 12.163868
## stopped after 100 iterations
## - Fold02: size=17, decay=0.05
## + Fold02: size=18, decay=0.05
## # weights:  361
## initial  value 184.002663
## iter  10 value 26.479505
## iter  20 value 15.901416
## iter  30 value 13.168801
## iter  40 value 12.421088
## iter  50 value 12.232322
## iter  60 value 12.168680
## iter  70 value 12.155930
## iter  80 value 12.143718
## iter  90 value 12.130204
## iter 100 value 12.117062
## final  value 12.117062
## stopped after 100 iterations
## - Fold02: size=18, decay=0.05
## + Fold02: size=19, decay=0.05
## # weights:  381
## initial  value 129.511255
## iter  10 value 20.615298
## iter  20 value 13.902519
## iter  30 value 12.552603
## iter  40 value 12.317227
## iter  50 value 12.271096
## iter  60 value 12.198224
## iter  70 value 12.147640
## iter  80 value 12.143707
## iter  90 value 12.141967
## iter 100 value 12.141486
## final  value 12.141486
## stopped after 100 iterations
## - Fold02: size=19, decay=0.05
## + Fold02: size=20, decay=0.05
## # weights:  401
## initial  value 152.709699
## iter  10 value 22.714740
## iter  20 value 14.598816
## iter  30 value 12.969201
## iter  40 value 12.521534
## iter  50 value 12.347140
## iter  60 value 12.286340
```

```
## iter  70 value 12.259691
## iter  80 value 12.145027
## iter  90 value 12.129285
## iter 100 value 12.127783
## final  value 12.127783
## stopped after 100 iterations
## - Fold02: size=20, decay=0.05
## + Fold02: size= 1, decay=0.10
## # weights:  21
## initial  value 107.925173
## iter  10 value 32.131850
## iter  20 value 28.231384
## iter  30 value 28.206441
## iter  30 value 28.206441
## iter  30 value 28.206441
## final  value 28.206441
## converged
## - Fold02: size= 1, decay=0.10
## + Fold02: size= 2, decay=0.10
## # weights:  41
## initial  value 120.457897
## iter  10 value 31.879545
## iter  20 value 24.094446
## iter  30 value 23.161375
## iter  40 value 23.003872
## iter  50 value 22.996174
## final  value 22.996073
## converged
## - Fold02: size= 2, decay=0.10
## + Fold02: size= 3, decay=0.10
## # weights:  61
## initial  value 144.097181
## iter  10 value 23.668524
## iter  20 value 20.920486
## iter  30 value 20.418689
## iter  40 value 20.387236
## iter  50 value 20.386123
## iter  50 value 20.386122
## iter  50 value 20.386122
## final  value 20.386122
## converged
## - Fold02: size= 3, decay=0.10
## + Fold02: size= 4, decay=0.10
## # weights:  81
## initial  value 119.959466
## iter  10 value 29.074149
## iter  20 value 22.935583
## iter  30 value 21.020624
## iter  40 value 19.798552
## iter  50 value 19.557967
## iter  60 value 19.544486
## iter  70 value 19.544040
## iter  80 value 19.544005
## iter  80 value 19.544005
```

```
## iter  80 value 19.544005
## final  value 19.544005
## converged
## - Fold02: size= 4, decay=0.10
## + Fold02: size= 5, decay=0.10
## # weights:  101
## initial  value 157.701156
## iter  10 value 24.040446
## iter  20 value 20.334836
## iter  30 value 19.959626
## iter  40 value 19.944822
## iter  50 value 19.937538
## iter  60 value 19.935539
## iter  70 value 19.935476
## final  value 19.935475
## converged
## - Fold02: size= 5, decay=0.10
## + Fold02: size= 6, decay=0.10
## # weights:  121
## initial  value 115.963919
## iter  10 value 32.455857
## iter  20 value 21.618532
## iter  30 value 19.712618
## iter  40 value 19.371271
## iter  50 value 19.090818
## iter  60 value 19.069467
## iter  70 value 19.063835
## iter  80 value 19.063258
## iter  90 value 19.063231
## final  value 19.063230
## converged
## - Fold02: size= 6, decay=0.10
## + Fold02: size= 7, decay=0.10
## # weights:  141
## initial  value 128.660637
## iter  10 value 25.522701
## iter  20 value 20.396113
## iter  30 value 19.258534
## iter  40 value 19.052925
## iter  50 value 19.024066
## iter  60 value 19.010535
## iter  70 value 18.987315
## iter  80 value 18.986913
## iter  90 value 18.986816
## final  value 18.986813
## converged
## - Fold02: size= 7, decay=0.10
## + Fold02: size= 8, decay=0.10
## # weights:  161
## initial  value 137.247579
## iter  10 value 30.133360
## iter  20 value 20.264638
## iter  30 value 19.527066
## iter  40 value 19.282286
```

```
## iter  50 value 19.066763
## iter  60 value 18.973241
## iter  70 value 18.951693
## iter  80 value 18.938231
## iter  90 value 18.936853
## iter 100 value 18.936604
## final  value 18.936604
## stopped after 100 iterations
## - Fold02: size= 8, decay=0.10
## + Fold02: size= 9, decay=0.10
## # weights:  181
## initial  value 116.913794
## iter  10 value 27.081311
## iter  20 value 20.502494
## iter  30 value 19.593253
## iter  40 value 19.067775
## iter  50 value 18.981651
## iter  60 value 18.862945
## iter  70 value 18.838891
## iter  80 value 18.835447
## iter  90 value 18.835067
## iter 100 value 18.834921
## final  value 18.834921
## stopped after 100 iterations
## - Fold02: size= 9, decay=0.10
## + Fold02: size=10, decay=0.10
## # weights:  201
## initial  value 107.896329
## iter  10 value 30.512831
## iter  20 value 20.272231
## iter  30 value 19.042862
## iter  40 value 18.867658
## iter  50 value 18.788891
## iter  60 value 18.775879
## iter  70 value 18.768935
## iter  80 value 18.767309
## iter  90 value 18.767085
## iter 100 value 18.767020
## final  value 18.767020
## stopped after 100 iterations
## - Fold02: size=10, decay=0.10
## + Fold02: size=11, decay=0.10
## # weights:  221
## initial  value 138.526678
## iter  10 value 24.191656
## iter  20 value 19.651471
## iter  30 value 19.062606
## iter  40 value 18.876897
## iter  50 value 18.813029
## iter  60 value 18.796524
## iter  70 value 18.772732
## iter  80 value 18.745597
## iter  90 value 18.743197
## iter 100 value 18.741232
```

```
## final  value 18.741232
## stopped after 100 iterations
## - Fold02: size=11, decay=0.10
## + Fold02: size=12, decay=0.10
## # weights:  241
## initial  value 216.018186
## iter  10 value 24.495343
## iter  20 value 19.952956
## iter  30 value 19.102731
## iter  40 value 18.819757
## iter  50 value 18.769336
## iter  60 value 18.752655
## iter  70 value 18.740012
## iter  80 value 18.736139
## iter  90 value 18.735641
## iter 100 value 18.735464
## final  value 18.735464
## stopped after 100 iterations
## - Fold02: size=12, decay=0.10
## + Fold02: size=13, decay=0.10
## # weights:  261
## initial  value 110.110762
## iter  10 value 22.664849
## iter  20 value 19.326868
## iter  30 value 18.812634
## iter  40 value 18.689996
## iter  50 value 18.665234
## iter  60 value 18.640105
## iter  70 value 18.637818
## iter  80 value 18.637054
## iter  90 value 18.636941
## iter 100 value 18.636933
## final  value 18.636933
## stopped after 100 iterations
## - Fold02: size=13, decay=0.10
## + Fold02: size=14, decay=0.10
## # weights:  281
## initial  value 129.897499
## iter  10 value 27.561618
## iter  20 value 20.840375
## iter  30 value 19.194988
## iter  40 value 18.943491
## iter  50 value 18.870004
## iter  60 value 18.847500
## iter  70 value 18.824394
## iter  80 value 18.809694
## iter  90 value 18.806054
## iter 100 value 18.804002
## final  value 18.804002
## stopped after 100 iterations
## - Fold02: size=14, decay=0.10
## + Fold02: size=15, decay=0.10
## # weights:  301
## initial  value 145.067571
```

```
## iter  10 value 24.001974
## iter  20 value 19.495265
## iter  30 value 18.836554
## iter  40 value 18.682159
## iter  50 value 18.647132
## iter  60 value 18.634510
## iter  70 value 18.631212
## iter  80 value 18.630457
## iter  90 value 18.630111
## iter 100 value 18.630027
## final  value 18.630027
## stopped after 100 iterations
## - Fold02: size=15, decay=0.10
## + Fold02: size=16, decay=0.10
## # weights:  321
## initial  value 139.979363
## iter  10 value 25.630554
## iter  20 value 19.424769
## iter  30 value 18.785538
## iter  40 value 18.662786
## iter  50 value 18.630639
## iter  60 value 18.619493
## iter  70 value 18.618388
## iter  80 value 18.618026
## iter  90 value 18.617864
## iter 100 value 18.617790
## final  value 18.617790
## stopped after 100 iterations
## - Fold02: size=16, decay=0.10
## + Fold02: size=17, decay=0.10
## # weights:  341
## initial  value 149.731747
## iter  10 value 30.034560
## iter  20 value 20.556492
## iter  30 value 19.073925
## iter  40 value 18.835588
## iter  50 value 18.777339
## iter  60 value 18.765799
## iter  70 value 18.714644
## iter  80 value 18.651447
## iter  90 value 18.636651
## iter 100 value 18.634938
## final  value 18.634938
## stopped after 100 iterations
## - Fold02: size=17, decay=0.10
## + Fold02: size=18, decay=0.10
## # weights:  361
## initial  value 196.240252
## iter  10 value 34.079618
## iter  20 value 21.428458
## iter  30 value 19.241454
## iter  40 value 18.843149
## iter  50 value 18.661444
## iter  60 value 18.619752
```

```
## iter  70 value 18.606027
## iter  80 value 18.602568
## iter  90 value 18.597007
## iter 100 value 18.594332
## final  value 18.594332
## stopped after 100 iterations
## - Fold02: size=18, decay=0.10
## + Fold02: size=19, decay=0.10
## # weights:  381
## initial  value 118.581361
## iter  10 value 22.245216
## iter  20 value 19.160631
## iter  30 value 18.778225
## iter  40 value 18.661926
## iter  50 value 18.631102
## iter  60 value 18.624934
## iter  70 value 18.620526
## iter  80 value 18.613225
## iter  90 value 18.611719
## iter 100 value 18.611166
## final  value 18.611166
## stopped after 100 iterations
## - Fold02: size=19, decay=0.10
## + Fold02: size=20, decay=0.10
## # weights:  401
## initial  value 153.345566
## iter  10 value 24.605474
## iter  20 value 20.223550
## iter  30 value 19.141975
## iter  40 value 18.807420
## iter  50 value 18.719862
## iter  60 value 18.695965
## iter  70 value 18.687136
## iter  80 value 18.605383
## iter  90 value 18.589942
## iter 100 value 18.586622
## final  value 18.586622
## stopped after 100 iterations
## - Fold02: size=20, decay=0.10
## + Fold03: size= 1, decay=0.00
## # weights:  21
## initial  value 116.829764
## iter  10 value 34.474933
## iter  20 value 27.176027
## iter  30 value 18.505660
## iter  40 value 16.415442
## iter  50 value 16.295178
## iter  60 value 16.274500
## iter  70 value 16.272999
## iter  80 value 16.272782
## iter  90 value 16.272612
## iter 100 value 16.272221
## final  value 16.272221
## stopped after 100 iterations
```

```
## - Fold03: size= 1, decay=0.00
## + Fold03: size= 2, decay=0.00
## # weights:  41
## initial  value 116.898178
## iter  10 value 13.214736
## iter  20 value 7.029083
## iter  30 value 6.191778
## iter  40 value 6.183618
## iter  50 value 6.182655
## iter  50 value 6.182655
## iter  50 value 6.182655
## final  value 6.182655
## converged
## - Fold03: size= 2, decay=0.00
## + Fold03: size= 3, decay=0.00
## # weights:  61
## initial  value 137.985283
## iter  10 value 18.462907
## iter  20 value 6.675806
## iter  30 value 4.210721
## iter  40 value 4.187616
## iter  50 value 4.186575
## iter  60 value 4.183386
## iter  70 value 4.170356
## iter  80 value 3.833873
## iter  90 value 3.803079
## iter 100 value 3.551055
## final  value 3.551055
## stopped after 100 iterations
## - Fold03: size= 3, decay=0.00
## + Fold03: size= 4, decay=0.00
## # weights:  81
## initial  value 115.858235
## iter  10 value 20.533899
## iter  20 value 11.010482
## iter  30 value 4.886478
## iter  40 value 3.067541
## iter  50 value 2.769565
## iter  60 value 2.715607
## iter  70 value 2.706291
## iter  80 value 2.703911
## iter  90 value 2.703463
## iter 100 value 2.703368
## final  value 2.703368
## stopped after 100 iterations
## - Fold03: size= 4, decay=0.00
## + Fold03: size= 5, decay=0.00
## # weights:  101
## initial  value 133.959558
## iter  10 value 16.264871
## iter  20 value 4.657567
## iter  30 value 3.388007
## iter  40 value 3.366358
## iter  50 value 3.365141
```

```
## iter  60 value 3.365087
## iter  70 value 3.365066
## final  value 3.365064
## converged
## - Fold03: size= 5, decay=0.00
## + Fold03: size= 6, decay=0.00
## # weights:  121
## initial  value 124.739154
## iter  10 value 19.707403
## iter  20 value 5.751449
## iter  30 value 3.414845
## iter  40 value 3.377203
## iter  50 value 3.366499
## iter  60 value 3.365111
## final  value 3.365058
## converged
## - Fold03: size= 6, decay=0.00
## + Fold03: size= 7, decay=0.00
## # weights:  141
## initial  value 114.997005
## iter  10 value 12.447477
## iter  20 value 5.009494
## iter  30 value 0.167644
## iter  40 value 0.002358
## final  value 0.000097
## converged
## - Fold03: size= 7, decay=0.00
## + Fold03: size= 8, decay=0.00
## # weights:  161
## initial  value 120.458324
## iter  10 value 12.688070
## iter  20 value 0.278929
## iter  30 value 0.003913
## iter  40 value 0.000306
## final  value 0.000094
## converged
## - Fold03: size= 8, decay=0.00
## + Fold03: size= 9, decay=0.00
## # weights:  181
## initial  value 142.594800
## iter  10 value 22.768735
## iter  20 value 4.547578
## iter  30 value 2.888412
## iter  40 value 2.002439
## iter  50 value 1.927550
## iter  60 value 1.917419
## iter  70 value 1.913914
## iter  80 value 1.913041
## iter  90 value 1.911814
## iter 100 value 1.911318
## final  value 1.911318
## stopped after 100 iterations
## - Fold03: size= 9, decay=0.00
## + Fold03: size=10, decay=0.00
```

```
## # weights:  201
## initial  value 149.895238
## iter  10 value 11.393561
## iter  20 value 0.210350
## iter  30 value 0.004823
## final  value 0.000098
## converged
## - Fold03: size=10, decay=0.00
## + Fold03: size=11, decay=0.00
## # weights:  221
## initial  value 151.876139
## iter  10 value 13.898326
## iter  20 value 0.606733
## iter  30 value 0.019613
## iter  40 value 0.001050
## iter  50 value 0.000468
## iter  60 value 0.000141
## final  value 0.000080
## converged
## - Fold03: size=11, decay=0.00
## + Fold03: size=12, decay=0.00
## # weights:  241
## initial  value 199.014274
## iter  10 value 16.552622
## iter  20 value 1.616311
## iter  30 value 0.009769
## iter  40 value 0.000912
## iter  50 value 0.000338
## final  value 0.000069
## converged
## - Fold03: size=12, decay=0.00
## + Fold03: size=13, decay=0.00
## # weights:  261
## initial  value 130.929862
## iter  10 value 16.367298
## iter  20 value 0.792070
## iter  30 value 0.004113
## iter  40 value 0.000624
## final  value 0.000082
## converged
## - Fold03: size=13, decay=0.00
## + Fold03: size=14, decay=0.00
## # weights:  281
## initial  value 171.499281
## iter  10 value 16.126749
## iter  20 value 2.523775
## iter  30 value 0.039597
## iter  40 value 0.004496
## iter  50 value 0.001220
## iter  60 value 0.000544
## iter  70 value 0.000105
## iter  70 value 0.000091
## iter  70 value 0.000091
## final  value 0.000091
```

```
## converged
## - Fold03: size=14, decay=0.00
## + Fold03: size=15, decay=0.00
## # weights:  301
## initial  value 138.555203
## iter  10 value 18.857084
## iter  20 value 3.394845
## iter  30 value 0.053504
## iter  40 value 0.001755
## iter  50 value 0.000673
## final  value 0.000092
## converged
## - Fold03: size=15, decay=0.00
## + Fold03: size=16, decay=0.00
## # weights:  321
## initial  value 109.150134
## iter  10 value 13.805254
## iter  20 value 0.522831
## iter  30 value 0.011906
## iter  40 value 0.001433
## iter  50 value 0.000303
## final  value 0.000099
## converged
## - Fold03: size=16, decay=0.00
## + Fold03: size=17, decay=0.00
## # weights:  341
## initial  value 117.305213
## iter  10 value 13.246340
## iter  20 value 0.800926
## iter  30 value 0.006383
## final  value 0.000062
## converged
## - Fold03: size=17, decay=0.00
## + Fold03: size=18, decay=0.00
## # weights:  361
## initial  value 128.029093
## iter  10 value 18.019058
## iter  20 value 2.178029
## iter  30 value 0.026370
## iter  40 value 0.002768
## iter  50 value 0.000294
## final  value 0.000078
## converged
## - Fold03: size=18, decay=0.00
## + Fold03: size=19, decay=0.00
## # weights:  381
## initial  value 165.800357
## iter  10 value 12.741065
## iter  20 value 0.443875
## iter  30 value 0.008067
## iter  40 value 0.000595
## iter  50 value 0.000288
## final  value 0.000062
## converged
```

```
## - Fold03: size=19, decay=0.00
## + Fold03: size=20, decay=0.00
## # weights:  401
## initial  value 136.768288
## iter  10 value 17.137137
## iter  20 value 1.863840
## iter  30 value 0.010542
## iter  40 value 0.001329
## iter  50 value 0.000252
## final  value 0.000071
## converged
## - Fold03: size=20, decay=0.00
## + Fold03: size= 1, decay=0.05
## # weights:  21
## initial  value 117.872365
## iter  10 value 40.780169
## iter  20 value 29.780473
## iter  30 value 26.797913
## iter  40 value 25.302144
## iter  50 value 25.293266
## final  value 25.293227
## converged
## - Fold03: size= 1, decay=0.05
## + Fold03: size= 2, decay=0.05
## # weights:  41
## initial  value 121.208507
## iter  10 value 39.367396
## iter  20 value 23.916475
## iter  30 value 20.440666
## iter  40 value 18.086464
## iter  50 value 17.665364
## iter  60 value 17.441580
## iter  70 value 17.395416
## iter  80 value 17.391124
## iter  90 value 17.391041
## final  value 17.391033
## converged
## - Fold03: size= 2, decay=0.05
## + Fold03: size= 3, decay=0.05
## # weights:  61
## initial  value 123.579066
## iter  10 value 25.517025
## iter  20 value 18.648721
## iter  30 value 17.849543
## iter  40 value 17.805440
## iter  50 value 17.796579
## iter  60 value 17.747825
## iter  70 value 17.734349
## final  value 17.734346
## converged
## - Fold03: size= 3, decay=0.05
## + Fold03: size= 4, decay=0.05
## # weights:  81
## initial  value 130.404449
```

```
## iter  10 value 21.289565
## iter  20 value 15.600620
## iter  30 value 14.388973
## iter  40 value 14.289128
## iter  50 value 14.278359
## iter  60 value 14.277298
## iter  70 value 14.277273
## final  value 14.277258
## converged
## - Fold03: size= 4, decay=0.05
## + Fold03: size= 5, decay=0.05
## # weights:  101
## initial  value 107.105060
## iter  10 value 24.887469
## iter  20 value 17.288163
## iter  30 value 14.794126
## iter  40 value 13.850940
## iter  50 value 13.782073
## iter  60 value 13.774874
## iter  70 value 13.772130
## iter  80 value 13.772019
## final  value 13.772018
## converged
## - Fold03: size= 5, decay=0.05
## + Fold03: size= 6, decay=0.05
## # weights:  121
## initial  value 129.166025
## iter  10 value 24.057984
## iter  20 value 17.010229
## iter  30 value 15.159635
## iter  40 value 14.602360
## iter  50 value 14.216451
## iter  60 value 13.979363
## iter  70 value 13.773426
## iter  80 value 13.752985
## iter  90 value 13.749052
## iter 100 value 13.748746
## final  value 13.748746
## stopped after 100 iterations
## - Fold03: size= 6, decay=0.05
## + Fold03: size= 7, decay=0.05
## # weights:  141
## initial  value 109.432607
## iter  10 value 30.163901
## iter  20 value 16.921241
## iter  30 value 14.921822
## iter  40 value 14.615625
## iter  50 value 14.559009
## iter  60 value 14.529513
## iter  70 value 14.520207
## iter  80 value 14.514265
## iter  90 value 14.440948
## iter 100 value 14.403997
## final  value 14.403997
```

```
## stopped after 100 iterations
## - Fold03: size= 7, decay=0.05
## + Fold03: size= 8, decay=0.05
## # weights:  161
## initial  value 149.054078
## iter  10 value 25.263909
## iter  20 value 15.563088
## iter  30 value 13.613344
## iter  40 value 13.357375
## iter  50 value 13.298465
## iter  60 value 13.232392
## iter  70 value 13.127397
## iter  80 value 13.009178
## iter  90 value 12.989893
## iter 100 value 12.971766
## final  value 12.971766
## stopped after 100 iterations
## - Fold03: size= 8, decay=0.05
## + Fold03: size= 9, decay=0.05
## # weights:  181
## initial  value 123.557188
## iter  10 value 19.349665
## iter  20 value 14.525566
## iter  30 value 13.434538
## iter  40 value 13.141732
## iter  50 value 13.094300
## iter  60 value 12.888666
## iter  70 value 12.839342
## iter  80 value 12.832411
## iter  90 value 12.820607
## iter 100 value 12.817640
## final  value 12.817640
## stopped after 100 iterations
## - Fold03: size= 9, decay=0.05
## + Fold03: size=10, decay=0.05
## # weights:  201
## initial  value 129.836851
## iter  10 value 27.055886
## iter  20 value 16.031157
## iter  30 value 13.980982
## iter  40 value 13.468381
## iter  50 value 13.183321
## iter  60 value 13.017770
## iter  70 value 12.860764
## iter  80 value 12.801256
## iter  90 value 12.786092
## iter 100 value 12.771549
## final  value 12.771549
## stopped after 100 iterations
## - Fold03: size=10, decay=0.05
## + Fold03: size=11, decay=0.05
## # weights:  221
## initial  value 133.832486
## iter  10 value 22.058984
```

```
## iter  20 value 14.477140
## iter  30 value 13.438626
## iter  40 value 13.035036
## iter  50 value 12.992124
## iter  60 value 12.971047
## iter  70 value 12.956710
## iter  80 value 12.950388
## iter  90 value 12.941210
## iter 100 value 12.933753
## final  value 12.933753
## stopped after 100 iterations
## - Fold03: size=11, decay=0.05
## + Fold03: size=12, decay=0.05
## # weights:  241
## initial  value 104.921875
## iter  10 value 22.115170
## iter  20 value 15.071045
## iter  30 value 13.362334
## iter  40 value 13.026475
## iter  50 value 12.932106
## iter  60 value 12.853572
## iter  70 value 12.831313
## iter  80 value 12.797859
## iter  90 value 12.785075
## iter 100 value 12.782019
## final  value 12.782019
## stopped after 100 iterations
## - Fold03: size=12, decay=0.05
## + Fold03: size=13, decay=0.05
## # weights:  261
## initial  value 142.748019
## iter  10 value 20.899069
## iter  20 value 15.086468
## iter  30 value 13.463868
## iter  40 value 13.067915
## iter  50 value 12.802773
## iter  60 value 12.763299
## iter  70 value 12.750993
## iter  80 value 12.748182
## iter  90 value 12.747485
## iter 100 value 12.747230
## final  value 12.747230
## stopped after 100 iterations
## - Fold03: size=13, decay=0.05
## + Fold03: size=14, decay=0.05
## # weights:  281
## initial  value 134.037528
## iter  10 value 28.914883
## iter  20 value 16.453076
## iter  30 value 14.160715
## iter  40 value 13.662397
## iter  50 value 13.537240
## iter  60 value 13.168168
## iter  70 value 12.893640
```

```
## iter  80 value 12.819923
## iter  90 value 12.792005
## iter 100 value 12.779265
## final  value 12.779265
## stopped after 100 iterations
## - Fold03: size=14, decay=0.05
## + Fold03: size=15, decay=0.05
## # weights:  301
## initial  value 108.088664
## iter  10 value 19.757842
## iter  20 value 15.024102
## iter  30 value 13.394316
## iter  40 value 12.911037
## iter  50 value 12.816430
## iter  60 value 12.776893
## iter  70 value 12.767439
## iter  80 value 12.763355
## iter  90 value 12.761746
## iter 100 value 12.761474
## final  value 12.761474
## stopped after 100 iterations
## - Fold03: size=15, decay=0.05
## + Fold03: size=16, decay=0.05
## # weights:  321
## initial  value 135.478136
## iter  10 value 24.076669
## iter  20 value 15.778336
## iter  30 value 13.414205
## iter  40 value 12.971154
## iter  50 value 12.871784
## iter  60 value 12.777058
## iter  70 value 12.747716
## iter  80 value 12.730768
## iter  90 value 12.724493
## iter 100 value 12.718458
## final  value 12.718458
## stopped after 100 iterations
## - Fold03: size=16, decay=0.05
## + Fold03: size=17, decay=0.05
## # weights:  341
## initial  value 141.162583
## iter  10 value 20.227389
## iter  20 value 14.913996
## iter  30 value 13.513865
## iter  40 value 12.914985
## iter  50 value 12.808518
## iter  60 value 12.695686
## iter  70 value 12.670244
## iter  80 value 12.656287
## iter  90 value 12.646508
## iter 100 value 12.644789
## final  value 12.644789
## stopped after 100 iterations
## - Fold03: size=17, decay=0.05
```

```
## + Fold03: size=18, decay=0.05
## # weights:  361
## initial  value 138.016995
## iter  10 value 21.287660
## iter  20 value 15.052633
## iter  30 value 13.610251
## iter  40 value 13.153677
## iter  50 value 12.937397
## iter  60 value 12.861780
## iter  70 value 12.801075
## iter  80 value 12.734774
## iter  90 value 12.715496
## iter 100 value 12.709020
## final  value 12.709020
## stopped after 100 iterations
## - Fold03: size=18, decay=0.05
## + Fold03: size=19, decay=0.05
## # weights:  381
## initial  value 123.761748
## iter  10 value 29.393671
## iter  20 value 16.447934
## iter  30 value 13.837631
## iter  40 value 13.451947
## iter  50 value 13.016573
## iter  60 value 12.814370
## iter  70 value 12.753614
## iter  80 value 12.733379
## iter  90 value 12.723264
## iter 100 value 12.715566
## final  value 12.715566
## stopped after 100 iterations
## - Fold03: size=19, decay=0.05
## + Fold03: size=20, decay=0.05
## # weights:  401
## initial  value 179.394315
## iter  10 value 23.856633
## iter  20 value 14.105470
## iter  30 value 13.041231
## iter  40 value 12.891234
## iter  50 value 12.827449
## iter  60 value 12.788821
## iter  70 value 12.767138
## iter  80 value 12.751043
## iter  90 value 12.724225
## iter 100 value 12.710595
## final  value 12.710595
## stopped after 100 iterations
## - Fold03: size=20, decay=0.05
## + Fold03: size= 1, decay=0.10
## # weights:  21
## initial  value 126.994489
## iter  10 value 52.063350
## iter  20 value 31.616485
## iter  30 value 30.501548
```

```
## final  value 30.500060
## converged
## - Fold03: size= 1, decay=0.10
## + Fold03: size= 2, decay=0.10
## # weights:  41
## initial  value 147.197452
## iter  10 value 36.172098
## iter  20 value 25.816109
## iter  30 value 24.888902
## iter  40 value 24.859749
## final  value 24.859742
## converged
## - Fold03: size= 2, decay=0.10
## + Fold03: size= 3, decay=0.10
## # weights:  61
## initial  value 122.647357
## iter  10 value 36.015714
## iter  20 value 25.694530
## iter  30 value 22.953860
## iter  40 value 22.127577
## iter  50 value 21.556804
## iter  60 value 21.030144
## iter  70 value 21.020643
## final  value 21.020628
## converged
## - Fold03: size= 3, decay=0.10
## + Fold03: size= 4, decay=0.10
## # weights:  81
## initial  value 125.719811
## iter  10 value 31.508309
## iter  20 value 22.339813
## iter  30 value 21.234051
## iter  40 value 20.901308
## iter  50 value 20.891670
## iter  60 value 20.886087
## iter  70 value 20.885961
## final  value 20.885957
## converged
## - Fold03: size= 4, decay=0.10
## + Fold03: size= 5, decay=0.10
## # weights:  101
## initial  value 118.047971
## iter  10 value 33.013514
## iter  20 value 22.210640
## iter  30 value 20.927520
## iter  40 value 20.725422
## iter  50 value 20.709861
## iter  60 value 20.706858
## iter  70 value 20.681819
## iter  80 value 20.618271
## iter  90 value 20.408435
## iter 100 value 20.386713
## final  value 20.386713
## stopped after 100 iterations
```

```
## - Fold03: size= 5, decay=0.10
## + Fold03: size= 6, decay=0.10
## # weights:  121
## initial  value 145.508093
## iter  10 value 29.650095
## iter  20 value 23.061026
## iter  30 value 21.418117
## iter  40 value 20.371207
## iter  50 value 20.147573
## iter  60 value 20.035419
## iter  70 value 20.007053
## iter  80 value 20.003953
## iter  90 value 20.002978
## iter 100 value 19.924421
## final  value 19.924421
## stopped after 100 iterations
## - Fold03: size= 6, decay=0.10
## + Fold03: size= 7, decay=0.10
## # weights:  141
## initial  value 121.723439
## iter  10 value 36.286490
## iter  20 value 21.443215
## iter  30 value 20.324077
## iter  40 value 20.233159
## iter  50 value 20.169835
## iter  60 value 20.110030
## iter  70 value 20.097554
## iter  80 value 20.094805
## iter  90 value 20.094130
## iter 100 value 20.091985
## final  value 20.091985
## stopped after 100 iterations
## - Fold03: size= 7, decay=0.10
## + Fold03: size= 8, decay=0.10
## # weights:  161
## initial  value 123.655804
## iter  10 value 28.442788
## iter  20 value 20.566298
## iter  30 value 20.031394
## iter  40 value 19.712605
## iter  50 value 19.628007
## iter  60 value 19.598333
## iter  70 value 19.581390
## iter  80 value 19.579508
## iter  90 value 19.579330
## final  value 19.579325
## converged
## - Fold03: size= 8, decay=0.10
## + Fold03: size= 9, decay=0.10
## # weights:  181
## initial  value 144.273027
## iter  10 value 36.200646
## iter  20 value 22.922132
## iter  30 value 21.038310
```

```
## iter  40 value 20.060793
## iter  50 value 19.795002
## iter  60 value 19.732390
## iter  70 value 19.725921
## iter  80 value 19.687006
## iter  90 value 19.614483
## iter 100 value 19.540262
## final  value 19.540262
## stopped after 100 iterations
## - Fold03: size= 9, decay=0.10
## + Fold03: size=10, decay=0.10
## # weights:  201
## initial  value 151.965618
## iter  10 value 31.719018
## iter  20 value 21.434510
## iter  30 value 20.071486
## iter  40 value 19.654297
## iter  50 value 19.594421
## iter  60 value 19.577702
## iter  70 value 19.570561
## iter  80 value 19.570390
## iter  90 value 19.570367
## iter 100 value 19.570363
## final  value 19.570363
## stopped after 100 iterations
## - Fold03: size=10, decay=0.10
## + Fold03: size=11, decay=0.10
## # weights:  221
## initial  value 127.994896
## iter  10 value 26.043401
## iter  20 value 20.445278
## iter  30 value 19.839651
## iter  40 value 19.612024
## iter  50 value 19.547957
## iter  60 value 19.533527
## iter  70 value 19.527262
## iter  80 value 19.526542
## iter  90 value 19.526447
## iter 100 value 19.526424
## final  value 19.526424
## stopped after 100 iterations
## - Fold03: size=11, decay=0.10
## + Fold03: size=12, decay=0.10
## # weights:  241
## initial  value 131.953648
## iter  10 value 34.308485
## iter  20 value 21.804162
## iter  30 value 20.496730
## iter  40 value 20.225744
## iter  50 value 19.917191
## iter  60 value 19.670702
## iter  70 value 19.593514
## iter  80 value 19.576771
## iter  90 value 19.566050
```

```
## iter 100 value 19.540885
## final  value 19.540885
## stopped after 100 iterations
## - Fold03: size=12, decay=0.10
## + Fold03: size=13, decay=0.10
## # weights:  261
## initial  value 175.884737
## iter  10 value 26.581819
## iter  20 value 20.710245
## iter  30 value 19.849070
## iter  40 value 19.622697
## iter  50 value 19.571903
## iter  60 value 19.529838
## iter  70 value 19.513590
## iter  80 value 19.494600
## iter  90 value 19.489820
## iter 100 value 19.489248
## final  value 19.489248
## stopped after 100 iterations
## - Fold03: size=13, decay=0.10
## + Fold03: size=14, decay=0.10
## # weights:  281
## initial  value 130.288542
## iter  10 value 30.727345
## iter  20 value 20.936592
## iter  30 value 20.139170
## iter  40 value 19.654997
## iter  50 value 19.515157
## iter  60 value 19.445442
## iter  70 value 19.413913
## iter  80 value 19.411094
## iter  90 value 19.410248
## iter 100 value 19.409177
## final  value 19.409177
## stopped after 100 iterations
## - Fold03: size=14, decay=0.10
## + Fold03: size=15, decay=0.10
## # weights:  301
## initial  value 120.570388
## iter  10 value 27.105283
## iter  20 value 20.687550
## iter  30 value 19.822040
## iter  40 value 19.513007
## iter  50 value 19.439338
## iter  60 value 19.430237
## iter  70 value 19.415021
## iter  80 value 19.401592
## iter  90 value 19.400699
## iter 100 value 19.399216
## final  value 19.399216
## stopped after 100 iterations
## - Fold03: size=15, decay=0.10
## + Fold03: size=16, decay=0.10
## # weights:  321
```

```
## initial  value 125.669537
## iter  10 value 30.137539
## iter  20 value 21.261436
## iter  30 value 19.843067
## iter  40 value 19.561075
## iter  50 value 19.464651
## iter  60 value 19.411271
## iter  70 value 19.398979
## iter  80 value 19.396327
## iter  90 value 19.390925
## iter 100 value 19.389060
## final  value 19.389060
## stopped after 100 iterations
## - Fold03: size=16, decay=0.10
## + Fold03: size=17, decay=0.10
## # weights:  341
## initial  value 118.284140
## iter  10 value 28.232450
## iter  20 value 21.154477
## iter  30 value 20.002085
## iter  40 value 19.613699
## iter  50 value 19.552635
## iter  60 value 19.539718
## iter  70 value 19.534681
## iter  80 value 19.515807
## iter  90 value 19.509159
## iter 100 value 19.501514
## final  value 19.501514
## stopped after 100 iterations
## - Fold03: size=17, decay=0.10
## + Fold03: size=18, decay=0.10
## # weights:  361
## initial  value 138.810664
## iter  10 value 25.525922
## iter  20 value 20.679517
## iter  30 value 19.935903
## iter  40 value 19.730259
## iter  50 value 19.558735
## iter  60 value 19.536215
## iter  70 value 19.528553
## iter  80 value 19.527547
## iter  90 value 19.527208
## iter 100 value 19.527097
## final  value 19.527097
## stopped after 100 iterations
## - Fold03: size=18, decay=0.10
## + Fold03: size=19, decay=0.10
## # weights:  381
## initial  value 188.287086
## iter  10 value 31.146023
## iter  20 value 21.607945
## iter  30 value 20.449380
## iter  40 value 19.838724
## iter  50 value 19.687479
```

```
## iter  60 value 19.619151
## iter  70 value 19.596991
## iter  80 value 19.578253
## iter  90 value 19.567747
## iter 100 value 19.565096
## final  value 19.565096
## stopped after 100 iterations
## - Fold03: size=19, decay=0.10
## + Fold03: size=20, decay=0.10
## # weights:  401
## initial  value 142.006664
## iter  10 value 38.648052
## iter  20 value 21.945908
## iter  30 value 20.116800
## iter  40 value 19.633077
## iter  50 value 19.500732
## iter  60 value 19.416795
## iter  70 value 19.406842
## iter  80 value 19.405033
## iter  90 value 19.393261
## iter 100 value 19.382128
## final  value 19.382128
## stopped after 100 iterations
## - Fold03: size=20, decay=0.10
## + Fold04: size= 1, decay=0.00
## # weights:  21
## initial  value 115.465830
## iter  10 value 43.143928
## iter  20 value 21.911525
## iter  30 value 19.317553
## iter  40 value 19.276117
## iter  50 value 19.142797
## iter  60 value 16.324808
## iter  70 value 16.290704
## iter  80 value 16.263287
## iter  90 value 13.257622
## iter 100 value 13.079665
## final  value 13.079665
## stopped after 100 iterations
## - Fold04: size= 1, decay=0.00
## + Fold04: size= 2, decay=0.00
## # weights:  41
## initial  value 119.789803
## iter  10 value 36.039191
## iter  20 value 15.646954
## iter  30 value 12.810703
## iter  40 value 11.338891
## iter  50 value 11.046645
## iter  60 value 10.654834
## iter  70 value 9.485135
## iter  80 value 8.162847
## iter  90 value 4.800290
## iter 100 value 2.525092
## final  value 2.525092
```

```
## stopped after 100 iterations
## - Fold04: size= 2, decay=0.00
## + Fold04: size= 3, decay=0.00
## # weights:  61
## initial  value 116.132754
## iter  10 value 21.062731
## iter  20 value 12.448930
## iter  30 value 7.813895
## iter  40 value 4.905576
## iter  50 value 4.786393
## iter  60 value 4.780509
## iter  70 value 4.780416
## iter  80 value 4.780357
## final  value 4.780357
## converged
## - Fold04: size= 3, decay=0.00
## + Fold04: size= 4, decay=0.00
## # weights:  81
## initial  value 120.140814
## iter  10 value 16.585374
## iter  20 value 4.235129
## iter  30 value 3.366955
## iter  40 value 3.365060
## final  value 3.365058
## converged
## - Fold04: size= 4, decay=0.00
## + Fold04: size= 5, decay=0.00
## # weights:  101
## initial  value 125.300933
## iter  10 value 17.861622
## iter  20 value 4.568083
## iter  30 value 2.903492
## iter  40 value 2.774778
## iter  50 value 2.772591
## final  value 2.772589
## converged
## - Fold04: size= 5, decay=0.00
## + Fold04: size= 6, decay=0.00
## # weights:  121
## initial  value 108.250532
## iter  10 value 15.892203
## iter  20 value 5.451846
## iter  30 value 0.537768
## iter  40 value 0.039269
## iter  50 value 0.008593
## iter  60 value 0.002673
## iter  70 value 0.000869
## iter  80 value 0.000446
## iter  90 value 0.000363
## final  value 0.000060
## converged
## - Fold04: size= 6, decay=0.00
## + Fold04: size= 7, decay=0.00
## # weights:  141
```

```
## initial  value 122.839375
## iter  10 value 16.090217
## iter  20 value 2.204645
## iter  30 value 0.017553
## iter  40 value 0.001439
## iter  50 value 0.000248
## final  value 0.000078
## converged
## - Fold04: size= 7, decay=0.00
## + Fold04: size= 8, decay=0.00
## # weights:  161
## initial  value 138.780343
## iter  10 value 16.023416
## iter  20 value 0.672318
## iter  30 value 0.006265
## iter  40 value 0.000583
## iter  50 value 0.000114
## iter  50 value 0.000068
## iter  50 value 0.000067
## final  value 0.000067
## converged
## - Fold04: size= 8, decay=0.00
## + Fold04: size= 9, decay=0.00
## # weights:  181
## initial  value 158.222000
## iter  10 value 13.863359
## iter  20 value 0.806183
## iter  30 value 0.014535
## iter  40 value 0.000793
## iter  50 value 0.000261
## final  value 0.000080
## converged
## - Fold04: size= 9, decay=0.00
## + Fold04: size=10, decay=0.00
## # weights:  201
## initial  value 146.123555
## iter  10 value 13.102605
## iter  20 value 0.970261
## iter  30 value 0.010558
## iter  40 value 0.000525
## iter  50 value 0.000342
## final  value 0.000085
## converged
## - Fold04: size=10, decay=0.00
## + Fold04: size=11, decay=0.00
## # weights:  221
## initial  value 174.949680
## iter  10 value 13.171061
## iter  20 value 0.338329
## iter  30 value 0.005379
## iter  40 value 0.000550
## iter  50 value 0.000265
## final  value 0.000064
## converged
```

```
## - Fold04: size=11, decay=0.00
## + Fold04: size=12, decay=0.00
## # weights:  241
## initial  value 124.899494
## iter  10 value 15.017221
## iter  20 value 1.064646
## iter  30 value 0.007471
## iter  40 value 0.000596
## iter  50 value 0.000135
## final  value 0.000097
## converged
## - Fold04: size=12, decay=0.00
## + Fold04: size=13, decay=0.00
## # weights:  261
## initial  value 121.542375
## iter  10 value 11.759705
## iter  20 value 0.674190
## iter  30 value 0.013129
## iter  40 value 0.001628
## iter  50 value 0.000131
## final  value 0.000099
## converged
## - Fold04: size=13, decay=0.00
## + Fold04: size=14, decay=0.00
## # weights:  281
## initial  value 128.654207
## iter  10 value 16.497561
## iter  20 value 0.930868
## iter  30 value 0.020034
## iter  40 value 0.001398
## final  value 0.000095
## converged
## - Fold04: size=14, decay=0.00
## + Fold04: size=15, decay=0.00
## # weights:  301
## initial  value 99.981478
## iter  10 value 10.701607
## iter  20 value 0.133212
## iter  30 value 0.002243
## final  value 0.000052
## converged
## - Fold04: size=15, decay=0.00
## + Fold04: size=16, decay=0.00
## # weights:  321
## initial  value 141.259416
## iter  10 value 7.226160
## iter  20 value 0.129060
## iter  30 value 0.005608
## iter  40 value 0.000827
## final  value 0.000071
## converged
## - Fold04: size=16, decay=0.00
## + Fold04: size=17, decay=0.00
## # weights:  341
```

```
## initial  value 124.473987
## iter  10 value 9.564253
## iter  20 value 0.237154
## iter  30 value 0.005626
## iter  40 value 0.000493
## iter  50 value 0.000125
## final  value 0.000080
## converged
## - Fold04: size=17, decay=0.00
## + Fold04: size=18, decay=0.00
## # weights:  361
## initial  value 147.998734
## iter  10 value 10.918079
## iter  20 value 0.272928
## iter  30 value 0.010792
## iter  40 value 0.001204
## final  value 0.000066
## converged
## - Fold04: size=18, decay=0.00
## + Fold04: size=19, decay=0.00
## # weights:  381
## initial  value 114.636581
## iter  10 value 11.613576
## iter  20 value 0.311980
## iter  30 value 0.004536
## iter  40 value 0.000230
## final  value 0.000075
## converged
## - Fold04: size=19, decay=0.00
## + Fold04: size=20, decay=0.00
## # weights:  401
## initial  value 154.328739
## iter  10 value 15.409879
## iter  20 value 0.221278
## iter  30 value 0.005041
## iter  40 value 0.000320
## iter  50 value 0.000178
## final  value 0.000068
## converged
## - Fold04: size=20, decay=0.00
## + Fold04: size= 1, decay=0.05
## # weights:  21
## initial  value 115.263924
## iter  10 value 28.111560
## iter  20 value 22.555586
## iter  30 value 22.425595
## final  value 22.425587
## converged
## - Fold04: size= 1, decay=0.05
## + Fold04: size= 2, decay=0.05
## # weights:  41
## initial  value 136.565016
## iter  10 value 24.304921
## iter  20 value 18.091790
```

```
## iter  30 value 16.356119
## iter  40 value 16.270418
## iter  50 value 16.268497
## final  value 16.268482
## converged
## - Fold04: size= 2, decay=0.05
## + Fold04: size= 3, decay=0.05
## # weights:  61
## initial  value 109.095938
## iter  10 value 41.595223
## iter  20 value 20.041211
## iter  30 value 17.075431
## iter  40 value 15.350345
## iter  50 value 14.332375
## iter  60 value 13.760952
## iter  70 value 13.738696
## iter  80 value 13.736885
## final  value 13.736851
## converged
## - Fold04: size= 3, decay=0.05
## + Fold04: size= 4, decay=0.05
## # weights:  81
## initial  value 134.760278
## iter  10 value 23.888836
## iter  20 value 17.797526
## iter  30 value 15.503407
## iter  40 value 14.633743
## iter  50 value 14.065029
## iter  60 value 13.522002
## iter  70 value 13.384922
## iter  80 value 13.372155
## iter  90 value 13.370635
## iter 100 value 13.370345
## final  value 13.370345
## stopped after 100 iterations
## - Fold04: size= 4, decay=0.05
## + Fold04: size= 5, decay=0.05
## # weights:  101
## initial  value 114.863409
## iter  10 value 30.709872
## iter  20 value 16.295808
## iter  30 value 14.089721
## iter  40 value 13.885857
## iter  50 value 13.858340
## iter  60 value 13.852830
## iter  70 value 13.851421
## iter  80 value 13.851326
## final  value 13.851291
## converged
## - Fold04: size= 5, decay=0.05
## + Fold04: size= 6, decay=0.05
## # weights:  121
## initial  value 111.690137
## iter  10 value 19.445094
```

```
## iter  20 value 14.044118
## iter  30 value 13.156787
## iter  40 value 12.884396
## iter  50 value 12.837246
## iter  60 value 12.836653
## iter  70 value 12.836557
## iter  80 value 12.836277
## iter  90 value 12.836152
## iter 100 value 12.836137
## final  value 12.836137
## stopped after 100 iterations
## - Fold04: size= 6, decay=0.05
## + Fold04: size= 7, decay=0.05
## # weights:  141
## initial  value 112.243227
## iter  10 value 22.874568
## iter  20 value 14.422076
## iter  30 value 13.433533
## iter  40 value 13.042974
## iter  50 value 12.862559
## iter  60 value 12.712402
## iter  70 value 12.590693
## iter  80 value 12.558758
## iter  90 value 12.553551
## iter 100 value 12.553105
## final  value 12.553105
## stopped after 100 iterations
## - Fold04: size= 7, decay=0.05
## + Fold04: size= 8, decay=0.05
## # weights:  161
## initial  value 112.384446
## iter  10 value 18.344987
## iter  20 value 13.805191
## iter  30 value 13.193506
## iter  40 value 13.024207
## iter  50 value 12.765297
## iter  60 value 12.617749
## iter  70 value 12.560709
## iter  80 value 12.490151
## iter  90 value 12.482879
## iter 100 value 12.479338
## final  value 12.479338
## stopped after 100 iterations
## - Fold04: size= 8, decay=0.05
## + Fold04: size= 9, decay=0.05
## # weights:  181
## initial  value 145.308093
## iter  10 value 20.643926
## iter  20 value 13.868488
## iter  30 value 13.050471
## iter  40 value 12.695746
## iter  50 value 12.492917
## iter  60 value 12.441164
## iter  70 value 12.434946
```

```
## iter  80 value 12.430579
## iter  90 value 12.428225
## iter 100 value 12.371726
## final  value 12.371726
## stopped after 100 iterations
## - Fold04: size= 9, decay=0.05
## + Fold04: size=10, decay=0.05
## # weights:  201
## initial  value 111.052843
## iter  10 value 27.251069
## iter  20 value 15.805994
## iter  30 value 13.497360
## iter  40 value 12.722912
## iter  50 value 12.568415
## iter  60 value 12.472385
## iter  70 value 12.426312
## iter  80 value 12.408820
## iter  90 value 12.405535
## iter 100 value 12.397886
## final  value 12.397886
## stopped after 100 iterations
## - Fold04: size=10, decay=0.05
## + Fold04: size=11, decay=0.05
## # weights:  221
## initial  value 122.531131
## iter  10 value 19.810490
## iter  20 value 13.477301
## iter  30 value 12.796432
## iter  40 value 12.540904
## iter  50 value 12.429886
## iter  60 value 12.338998
## iter  70 value 12.314825
## iter  80 value 12.309735
## iter  90 value 12.309107
## iter 100 value 12.306477
## final  value 12.306477
## stopped after 100 iterations
## - Fold04: size=11, decay=0.05
## + Fold04: size=12, decay=0.05
## # weights:  241
## initial  value 150.535724
## iter  10 value 28.821864
## iter  20 value 15.941699
## iter  30 value 13.231298
## iter  40 value 12.594671
## iter  50 value 12.469766
## iter  60 value 12.405444
## iter  70 value 12.383700
## iter  80 value 12.369287
## iter  90 value 12.364257
## iter 100 value 12.362173
## final  value 12.362173
## stopped after 100 iterations
## - Fold04: size=12, decay=0.05
```

```
## + Fold04: size=13, decay=0.05
## # weights:  261
## initial  value 120.427984
## iter  10 value 17.774925
## iter  20 value 13.944159
## iter  30 value 12.893630
## iter  40 value 12.408660
## iter  50 value 12.295024
## iter  60 value 12.253072
## iter  70 value 12.241920
## iter  80 value 12.237468
## iter  90 value 12.235144
## iter 100 value 12.234601
## final  value 12.234601
## stopped after 100 iterations
## - Fold04: size=13, decay=0.05
## + Fold04: size=14, decay=0.05
## # weights:  281
## initial  value 149.828587
## iter  10 value 23.839932
## iter  20 value 15.836706
## iter  30 value 13.208432
## iter  40 value 12.570848
## iter  50 value 12.353917
## iter  60 value 12.270274
## iter  70 value 12.239041
## iter  80 value 12.227044
## iter  90 value 12.224584
## iter 100 value 12.223430
## final  value 12.223430
## stopped after 100 iterations
## - Fold04: size=14, decay=0.05
## + Fold04: size=15, decay=0.05
## # weights:  301
## initial  value 151.553595
## iter  10 value 22.311603
## iter  20 value 15.411112
## iter  30 value 13.300765
## iter  40 value 12.652256
## iter  50 value 12.431526
## iter  60 value 12.365088
## iter  70 value 12.346650
## iter  80 value 12.341069
## iter  90 value 12.338371
## iter 100 value 12.336372
## final  value 12.336372
## stopped after 100 iterations
## - Fold04: size=15, decay=0.05
## + Fold04: size=16, decay=0.05
## # weights:  321
## initial  value 149.569691
## iter  10 value 19.790156
## iter  20 value 13.940956
## iter  30 value 12.948847
```

```
## iter  40 value 12.623549
## iter  50 value 12.453583
## iter  60 value 12.366091
## iter  70 value 12.334835
## iter  80 value 12.314854
## iter  90 value 12.278599
## iter 100 value 12.262476
## final  value 12.262476
## stopped after 100 iterations
## - Fold04: size=16, decay=0.05
## + Fold04: size=17, decay=0.05
## # weights:  341
## initial  value 125.987678
## iter  10 value 18.258500
## iter  20 value 13.553544
## iter  30 value 12.663983
## iter  40 value 12.451847
## iter  50 value 12.317267
## iter  60 value 12.267770
## iter  70 value 12.235786
## iter  80 value 12.227566
## iter  90 value 12.223439
## iter 100 value 12.216770
## final  value 12.216770
## stopped after 100 iterations
## - Fold04: size=17, decay=0.05
## + Fold04: size=18, decay=0.05
## # weights:  361
## initial  value 136.901105
## iter  10 value 19.680875
## iter  20 value 13.053468
## iter  30 value 12.516181
## iter  40 value 12.384038
## iter  50 value 12.329025
## iter  60 value 12.281000
## iter  70 value 12.264660
## iter  80 value 12.253398
## iter  90 value 12.247389
## iter 100 value 12.244505
## final  value 12.244505
## stopped after 100 iterations
## - Fold04: size=18, decay=0.05
## + Fold04: size=19, decay=0.05
## # weights:  381
## initial  value 177.643762
## iter  10 value 20.250990
## iter  20 value 14.232405
## iter  30 value 12.865153
## iter  40 value 12.509301
## iter  50 value 12.428205
## iter  60 value 12.346877
## iter  70 value 12.295042
## iter  80 value 12.263141
## iter  90 value 12.256329
```

```
## iter 100 value 12.251219
## final  value 12.251219
## stopped after 100 iterations
## - Fold04: size=19, decay=0.05
## + Fold04: size=20, decay=0.05
## # weights:  401
## initial  value 143.874862
## iter  10 value 19.831761
## iter  20 value 13.327226
## iter  30 value 12.459266
## iter  40 value 12.284216
## iter  50 value 12.241348
## iter  60 value 12.225175
## iter  70 value 12.218249
## iter  80 value 12.214884
## iter  90 value 12.212117
## iter 100 value 12.210674
## final  value 12.210674
## stopped after 100 iterations
## - Fold04: size=20, decay=0.05
## + Fold04: size= 1, decay=0.10
## # weights:  21
## initial  value 123.853220
## iter  10 value 48.421222
## iter  20 value 33.394644
## iter  30 value 27.804855
## iter  40 value 27.787081
## iter  40 value 27.787081
## iter  40 value 27.787081
## final  value 27.787081
## converged
## - Fold04: size= 1, decay=0.10
## + Fold04: size= 2, decay=0.10
## # weights:  41
## initial  value 119.818527
## iter  10 value 38.123658
## iter  20 value 25.948487
## iter  30 value 23.763835
## iter  40 value 23.097330
## iter  50 value 23.036449
## iter  60 value 23.029028
## iter  70 value 23.028804
## final  value 23.028804
## converged
## - Fold04: size= 2, decay=0.10
## + Fold04: size= 3, decay=0.10
## # weights:  61
## initial  value 137.038694
## iter  10 value 59.629204
## iter  20 value 26.841501
## iter  30 value 24.114964
## iter  40 value 22.760273
## iter  50 value 21.599545
## iter  60 value 20.786458
```

```
## iter  70 value 20.210673
## iter  80 value 20.200901
## iter  90 value 20.199504
## iter 100 value 20.199483
## final  value 20.199483
## stopped after 100 iterations
## - Fold04: size= 3, decay=0.10
## + Fold04: size= 4, decay=0.10
## # weights:  81
## initial  value 111.727621
## iter  10 value 25.525588
## iter  20 value 21.257782
## iter  30 value 19.906447
## iter  40 value 19.594811
## iter  50 value 19.543575
## iter  60 value 19.543469
## iter  60 value 19.543469
## iter  60 value 19.543469
## final  value 19.543469
## converged
## - Fold04: size= 4, decay=0.10
## + Fold04: size= 5, decay=0.10
## # weights:  101
## initial  value 133.458429
## iter  10 value 25.612369
## iter  20 value 21.225011
## iter  30 value 19.849798
## iter  40 value 19.593955
## iter  50 value 19.523828
## iter  60 value 19.510602
## iter  70 value 19.509447
## final  value 19.509425
## converged
## - Fold04: size= 5, decay=0.10
## + Fold04: size= 6, decay=0.10
## # weights:  121
## initial  value 180.282646
## iter  10 value 34.344267
## iter  20 value 21.243022
## iter  30 value 19.731548
## iter  40 value 19.353132
## iter  50 value 19.253870
## iter  60 value 19.244576
## iter  70 value 19.241857
## iter  80 value 19.241817
## iter  90 value 19.241812
## iter  90 value 19.241811
## iter  90 value 19.241811
## final  value 19.241811
## converged
## - Fold04: size= 6, decay=0.10
## + Fold04: size= 7, decay=0.10
## # weights:  141
## initial  value 149.184174
```

```
## iter  10 value 29.590077
## iter  20 value 21.895982
## iter  30 value 20.032275
## iter  40 value 19.474575
## iter  50 value 19.204017
## iter  60 value 19.144762
## iter  70 value 19.103527
## iter  80 value 19.093351
## iter  90 value 19.092286
## iter 100 value 19.092141
## final  value 19.092141
## stopped after 100 iterations
## - Fold04: size= 7, decay=0.10
## + Fold04: size= 8, decay=0.10
## # weights:  161
## initial  value 135.503087
## iter  10 value 30.033945
## iter  20 value 21.983165
## iter  30 value 19.798732
## iter  40 value 19.339584
## iter  50 value 19.115813
## iter  60 value 19.081538
## iter  70 value 19.072315
## iter  80 value 19.070559
## iter  90 value 19.068017
## iter 100 value 19.060653
## final  value 19.060653
## stopped after 100 iterations
## - Fold04: size= 8, decay=0.10
## + Fold04: size= 9, decay=0.10
## # weights:  181
## initial  value 111.961056
## iter  10 value 24.592585
## iter  20 value 20.091696
## iter  30 value 19.332020
## iter  40 value 19.033762
## iter  50 value 18.899871
## iter  60 value 18.802611
## iter  70 value 18.791202
## iter  80 value 18.789313
## iter  90 value 18.788742
## iter 100 value 18.788589
## final  value 18.788589
## stopped after 100 iterations
## - Fold04: size= 9, decay=0.10
## + Fold04: size=10, decay=0.10
## # weights:  201
## initial  value 152.781835
## iter  10 value 27.271603
## iter  20 value 20.566490
## iter  30 value 19.417134
## iter  40 value 19.131634
## iter  50 value 19.055810
## iter  60 value 18.819823
```

```
## iter  70 value 18.774872
## iter  80 value 18.737268
## iter  90 value 18.720248
## iter 100 value 18.718428
## final  value 18.718428
## stopped after 100 iterations
## - Fold04: size=10, decay=0.10
## + Fold04: size=11, decay=0.10
## # weights:  221
## initial  value 144.433989
## iter  10 value 28.250238
## iter  20 value 19.606595
## iter  30 value 18.864486
## iter  40 value 18.753903
## iter  50 value 18.693974
## iter  60 value 18.605813
## iter  70 value 18.592934
## iter  80 value 18.591219
## iter  90 value 18.590901
## iter 100 value 18.590835
## final  value 18.590835
## stopped after 100 iterations
## - Fold04: size=11, decay=0.10
## + Fold04: size=12, decay=0.10
## # weights:  241
## initial  value 118.802799
## iter  10 value 25.259459
## iter  20 value 19.859349
## iter  30 value 18.918469
## iter  40 value 18.772883
## iter  50 value 18.715488
## iter  60 value 18.710635
## iter  70 value 18.710148
## iter  80 value 18.710048
## iter  90 value 18.708104
## iter 100 value 18.685970
## final  value 18.685970
## stopped after 100 iterations
## - Fold04: size=12, decay=0.10
## + Fold04: size=13, decay=0.10
## # weights:  261
## initial  value 111.267028
## iter  10 value 24.587156
## iter  20 value 20.233656
## iter  30 value 19.269525
## iter  40 value 18.895078
## iter  50 value 18.797357
## iter  60 value 18.713102
## iter  70 value 18.656040
## iter  80 value 18.600295
## iter  90 value 18.565260
## iter 100 value 18.562235
## final  value 18.562235
## stopped after 100 iterations
```

```
## - Fold04: size=13, decay=0.10
## + Fold04: size=14, decay=0.10
## # weights:  281
## initial  value 157.679081
## iter  10 value 30.833192
## iter  20 value 19.735958
## iter  30 value 19.083803
## iter  40 value 18.906428
## iter  50 value 18.735610
## iter  60 value 18.690395
## iter  70 value 18.680988
## iter  80 value 18.643627
## iter  90 value 18.631918
## iter 100 value 18.629548
## final  value 18.629548
## stopped after 100 iterations
## - Fold04: size=14, decay=0.10
## + Fold04: size=15, decay=0.10
## # weights:  301
## initial  value 120.722289
## iter  10 value 28.571008
## iter  20 value 19.584342
## iter  30 value 18.874674
## iter  40 value 18.661962
## iter  50 value 18.625210
## iter  60 value 18.604323
## iter  70 value 18.587287
## iter  80 value 18.577255
## iter  90 value 18.576494
## iter 100 value 18.575944
## final  value 18.575944
## stopped after 100 iterations
## - Fold04: size=15, decay=0.10
## + Fold04: size=16, decay=0.10
## # weights:  321
## initial  value 140.011396
## iter  10 value 55.540964
## iter  20 value 23.939132
## iter  30 value 19.332194
## iter  40 value 18.866714
## iter  50 value 18.722246
## iter  60 value 18.671798
## iter  70 value 18.663587
## iter  80 value 18.662146
## iter  90 value 18.660460
## iter 100 value 18.641865
## final  value 18.641865
## stopped after 100 iterations
## - Fold04: size=16, decay=0.10
## + Fold04: size=17, decay=0.10
## # weights:  341
## initial  value 153.146766
## iter  10 value 24.747954
## iter  20 value 19.527128
```

```
## iter  30 value 18.996054
## iter  40 value 18.917127
## iter  50 value 18.864012
## iter  60 value 18.783931
## iter  70 value 18.698240
## iter  80 value 18.692693
## iter  90 value 18.688032
## iter 100 value 18.658122
## final  value 18.658122
## stopped after 100 iterations
## - Fold04: size=17, decay=0.10
## + Fold04: size=18, decay=0.10
## # weights:  361
## initial  value 123.664559
## iter  10 value 47.159078
## iter  20 value 22.962965
## iter  30 value 19.717474
## iter  40 value 18.940939
## iter  50 value 18.684624
## iter  60 value 18.640678
## iter  70 value 18.632778
## iter  80 value 18.631879
## iter  90 value 18.631621
## iter 100 value 18.631308
## final  value 18.631308
## stopped after 100 iterations
## - Fold04: size=18, decay=0.10
## + Fold04: size=19, decay=0.10
## # weights:  381
## initial  value 151.526262
## iter  10 value 24.646801
## iter  20 value 19.203074
## iter  30 value 18.828682
## iter  40 value 18.590257
## iter  50 value 18.531806
## iter  60 value 18.522345
## iter  70 value 18.519015
## iter  80 value 18.516886
## iter  90 value 18.516264
## iter 100 value 18.516053
## final  value 18.516053
## stopped after 100 iterations
## - Fold04: size=19, decay=0.10
## + Fold04: size=20, decay=0.10
## # weights:  401
## initial  value 162.095987
## iter  10 value 38.284337
## iter  20 value 20.974573
## iter  30 value 19.286890
## iter  40 value 18.992477
## iter  50 value 18.892858
## iter  60 value 18.795574
## iter  70 value 18.679111
## iter  80 value 18.667029
```

```
## iter  90 value 18.639056
## iter 100 value 18.616121
## final  value 18.616121
## stopped after 100 iterations
## - Fold04: size=20, decay=0.10
## + Fold05: size= 1, decay=0.00
## # weights:  21
## initial  value 123.863558
## iter  10 value 34.466309
## iter  20 value 22.146831
## iter  30 value 14.194127
## iter  40 value 13.063831
## iter  50 value 13.050354
## iter  60 value 13.049978
## iter  70 value 13.049906
## iter  80 value 13.049851
## iter  90 value 13.049838
## final  value 13.049837
## converged
## - Fold05: size= 1, decay=0.00
## + Fold05: size= 2, decay=0.00
## # weights:  41
## initial  value 122.481867
## iter  10 value 22.956864
## iter  20 value 13.791399
## iter  30 value 12.914442
## iter  40 value 12.905238
## iter  50 value 12.688733
## iter  60 value 12.641688
## iter  70 value 12.571275
## iter  80 value 12.452235
## iter  90 value 12.187766
## iter 100 value 12.114400
## final  value 12.114400
## stopped after 100 iterations
## - Fold05: size= 2, decay=0.00
## + Fold05: size= 3, decay=0.00
## # weights:  61
## initial  value 138.790428
## iter  10 value 29.664870
## iter  20 value 17.486943
## iter  30 value 9.521304
## iter  40 value 6.487733
## iter  50 value 4.902074
## iter  60 value 4.376284
## iter  70 value 4.079463
## iter  80 value 3.995497
## iter  90 value 3.939832
## iter 100 value 3.891086
## final  value 3.891086
## stopped after 100 iterations
## - Fold05: size= 3, decay=0.00
## + Fold05: size= 4, decay=0.00
## # weights:  81
```

```
## initial  value 117.519131
## iter  10 value 20.242771
## iter  20 value 9.274748
## iter  30 value 3.890317
## iter  40 value 3.353270
## iter  50 value 3.150847
## iter  60 value 3.144086
## iter  70 value 3.142923
## iter  80 value 3.025819
## iter  90 value 3.014987
## iter 100 value 3.014342
## final  value 3.014342
## stopped after 100 iterations
## - Fold05: size= 4, decay=0.00
## + Fold05: size= 5, decay=0.00
## # weights:  101
## initial  value 146.327243
## iter  10 value 25.634123
## iter  20 value 4.645981
## iter  30 value 0.146563
## iter  40 value 0.020586
## iter  50 value 0.003295
## iter  60 value 0.000454
## iter  70 value 0.000189
## final  value 0.000098
## converged
## - Fold05: size= 5, decay=0.00
## + Fold05: size= 6, decay=0.00
## # weights:  121
## initial  value 111.532758
## iter  10 value 16.031564
## iter  20 value 5.228634
## iter  30 value 1.677497
## iter  40 value 1.419985
## iter  50 value 1.394911
## iter  60 value 1.389772
## iter  70 value 1.387134
## iter  80 value 1.386515
## iter  90 value 1.386463
## iter 100 value 1.386423
## final  value 1.386423
## stopped after 100 iterations
## - Fold05: size= 6, decay=0.00
## + Fold05: size= 7, decay=0.00
## # weights:  141
## initial  value 119.232411
## iter  10 value 18.503816
## iter  20 value 2.412157
## iter  30 value 0.105444
## iter  40 value 0.004753
## iter  50 value 0.000494
## iter  60 value 0.000106
## final  value 0.000099
## converged
```

```
## - Fold05: size= 7, decay=0.00
## + Fold05: size= 8, decay=0.00
## # weights:  161
## initial  value 103.376938
## iter  10 value 8.770084
## iter  20 value 0.472300
## iter  30 value 0.014270
## iter  40 value 0.000711
## iter  50 value 0.000319
## iter  60 value 0.000151
## final  value 0.000079
## converged
## - Fold05: size= 8, decay=0.00
## + Fold05: size= 9, decay=0.00
## # weights:  181
## initial  value 117.238118
## iter  10 value 14.089526
## iter  20 value 0.193193
## iter  30 value 0.005460
## iter  40 value 0.000555
## iter  50 value 0.000182
## final  value 0.000092
## converged
## - Fold05: size= 9, decay=0.00
## + Fold05: size=10, decay=0.00
## # weights:  201
## initial  value 111.738175
## iter  10 value 15.678286
## iter  20 value 2.125671
## iter  30 value 1.398319
## iter  40 value 0.053634
## iter  50 value 0.021266
## iter  60 value 0.005997
## iter  70 value 0.003256
## iter  80 value 0.002270
## iter  90 value 0.001567
## iter 100 value 0.000453
## final  value 0.000453
## stopped after 100 iterations
## - Fold05: size=10, decay=0.00
## + Fold05: size=11, decay=0.00
## # weights:  221
## initial  value 152.559646
## iter  10 value 13.665216
## iter  20 value 0.187627
## iter  30 value 0.006222
## iter  40 value 0.000125
## iter  40 value 0.000073
## iter  40 value 0.000073
## final  value 0.000073
## converged
## - Fold05: size=11, decay=0.00
## + Fold05: size=12, decay=0.00
## # weights:  241
```

```
## initial  value 128.639379
## iter  10 value 10.818634
## iter  20 value 0.653761
## iter  30 value 0.011752
## iter  40 value 0.001345
## iter  50 value 0.000385
## final  value 0.000099
## converged
## - Fold05: size=12, decay=0.00
## + Fold05: size=13, decay=0.00
## # weights:  261
## initial  value 117.608685
## iter  10 value 13.381817
## iter  20 value 0.595104
## iter  30 value 0.003673
## final  value 0.000073
## converged
## - Fold05: size=13, decay=0.00
## + Fold05: size=14, decay=0.00
## # weights:  281
## initial  value 123.812875
## iter  10 value 8.666709
## iter  20 value 0.123161
## iter  30 value 0.004810
## iter  40 value 0.000226
## final  value 0.000082
## converged
## - Fold05: size=14, decay=0.00
## + Fold05: size=15, decay=0.00
## # weights:  301
## initial  value 121.802534
## iter  10 value 8.418258
## iter  20 value 0.157913
## iter  30 value 0.002433
## iter  40 value 0.000278
## iter  50 value 0.000105
## iter  50 value 0.000083
## iter  50 value 0.000082
## final  value 0.000082
## converged
## - Fold05: size=15, decay=0.00
## + Fold05: size=16, decay=0.00
## # weights:  321
## initial  value 108.440424
## iter  10 value 10.622980
## iter  20 value 0.190649
## iter  30 value 0.004794
## iter  40 value 0.000532
## iter  50 value 0.000277
## final  value 0.000074
## converged
## - Fold05: size=16, decay=0.00
## + Fold05: size=17, decay=0.00
## # weights:  341
```

```
## initial  value 117.284703
## iter  10 value 12.061347
## iter  20 value 0.806683
## iter  30 value 0.012803
## iter  40 value 0.000455
## final  value 0.000095
## converged
## - Fold05: size=17, decay=0.00
## + Fold05: size=18, decay=0.00
## # weights:  361
## initial  value 143.348187
## iter  10 value 10.735773
## iter  20 value 0.544895
## iter  30 value 0.009777
## iter  40 value 0.000499
## final  value 0.000095
## converged
## - Fold05: size=18, decay=0.00
## + Fold05: size=19, decay=0.00
## # weights:  381
## initial  value 119.222160
## iter  10 value 10.793294
## iter  20 value 0.491186
## iter  30 value 0.012807
## iter  40 value 0.000951
## iter  50 value 0.000180
## final  value 0.000096
## converged
## - Fold05: size=19, decay=0.00
## + Fold05: size=20, decay=0.00
## # weights:  401
## initial  value 132.508975
## iter  10 value 12.319641
## iter  20 value 0.297119
## iter  30 value 0.005223
## iter  40 value 0.001039
## iter  50 value 0.000205
## final  value 0.000072
## converged
## - Fold05: size=20, decay=0.00
## + Fold05: size= 1, decay=0.05
## # weights:  21
## initial  value 115.454712
## iter  10 value 44.452422
## iter  20 value 29.901726
## iter  30 value 27.369332
## iter  40 value 25.201564
## final  value 25.196932
## converged
## - Fold05: size= 1, decay=0.05
## + Fold05: size= 2, decay=0.05
## # weights:  41
## initial  value 125.621628
## iter  10 value 40.023172
```

```
## iter  20 value 22.606467
## iter  30 value 19.092864
## iter  40 value 17.952287
## iter  50 value 17.434468
## iter  60 value 17.431351
## iter  60 value 17.431351
## iter  60 value 17.431351
## final  value 17.431351
## converged
## - Fold05: size= 2, decay=0.05
## + Fold05: size= 3, decay=0.05
## # weights:  61
## initial  value 125.035252
## iter  10 value 20.935307
## iter  20 value 17.872317
## iter  30 value 17.008638
## iter  40 value 16.580469
## iter  50 value 16.458553
## iter  60 value 16.283169
## iter  70 value 16.115521
## iter  80 value 16.062045
## iter  90 value 16.060918
## final  value 16.060916
## converged
## - Fold05: size= 3, decay=0.05
## + Fold05: size= 4, decay=0.05
## # weights:  81
## initial  value 119.222968
## iter  10 value 27.398277
## iter  20 value 17.215964
## iter  30 value 14.175486
## iter  40 value 13.878365
## iter  50 value 13.826367
## iter  60 value 13.755970
## iter  70 value 13.717966
## iter  80 value 13.709622
## final  value 13.709556
## converged
## - Fold05: size= 4, decay=0.05
## + Fold05: size= 5, decay=0.05
## # weights:  101
## initial  value 120.078513
## iter  10 value 19.677315
## iter  20 value 15.547225
## iter  30 value 14.627040
## iter  40 value 14.341321
## iter  50 value 14.315030
## iter  60 value 14.312851
## iter  70 value 14.311290
## iter  80 value 14.311265
## final  value 14.311265
## converged
## - Fold05: size= 5, decay=0.05
## + Fold05: size= 6, decay=0.05
```

```
## # weights:  121
## initial  value 123.448411
## iter  10 value 23.194034
## iter  20 value 14.934229
## iter  30 value 13.479296
## iter  40 value 12.962695
## iter  50 value 12.852879
## iter  60 value 12.825155
## iter  70 value 12.816396
## iter  80 value 12.812057
## iter  90 value 12.811929
## final  value 12.811912
## converged
## - Fold05: size= 6, decay=0.05
## + Fold05: size= 7, decay=0.05
## # weights:  141
## initial  value 138.428182
## iter  10 value 22.986409
## iter  20 value 14.178124
## iter  30 value 13.125505
## iter  40 value 12.932548
## iter  50 value 12.828298
## iter  60 value 12.615801
## iter  70 value 12.594640
## iter  80 value 12.592350
## iter  90 value 12.592165
## iter 100 value 12.592020
## final  value 12.592020
## stopped after 100 iterations
## - Fold05: size= 7, decay=0.05
## + Fold05: size= 8, decay=0.05
## # weights:  161
## initial  value 131.914168
## iter  10 value 20.916165
## iter  20 value 15.237753
## iter  30 value 13.604648
## iter  40 value 13.358115
## iter  50 value 13.199684
## iter  60 value 12.614652
## iter  70 value 12.404599
## iter  80 value 12.293039
## iter  90 value 12.265251
## iter 100 value 12.258717
## final  value 12.258717
## stopped after 100 iterations
## - Fold05: size= 8, decay=0.05
## + Fold05: size= 9, decay=0.05
## # weights:  181
## initial  value 114.290438
## iter  10 value 28.962103
## iter  20 value 16.315641
## iter  30 value 13.329311
## iter  40 value 12.519839
## iter  50 value 12.339814
```

```
## iter  60 value 12.261414
## iter  70 value 12.252533
## iter  80 value 12.249293
## iter  90 value 12.247778
## iter 100 value 12.246963
## final  value 12.246963
## stopped after 100 iterations
## - Fold05: size= 9, decay=0.05
## + Fold05: size=10, decay=0.05
## # weights:  201
## initial  value 123.026219
## iter  10 value 19.698850
## iter  20 value 14.456889
## iter  30 value 13.507756
## iter  40 value 13.150668
## iter  50 value 13.018790
## iter  60 value 12.722428
## iter  70 value 12.629941
## iter  80 value 12.523336
## iter  90 value 12.407132
## iter 100 value 12.354849
## final  value 12.354849
## stopped after 100 iterations
## - Fold05: size=10, decay=0.05
## + Fold05: size=11, decay=0.05
## # weights:  221
## initial  value 151.567243
## iter  10 value 18.682498
## iter  20 value 14.108291
## iter  30 value 12.631519
## iter  40 value 12.350275
## iter  50 value 12.229004
## iter  60 value 12.193110
## iter  70 value 12.173448
## iter  80 value 12.166617
## iter  90 value 12.164823
## iter 100 value 12.161621
## final  value 12.161621
## stopped after 100 iterations
## - Fold05: size=11, decay=0.05
## + Fold05: size=12, decay=0.05
## # weights:  241
## initial  value 128.901508
## iter  10 value 20.072195
## iter  20 value 14.347425
## iter  30 value 12.746343
## iter  40 value 12.502613
## iter  50 value 12.438784
## iter  60 value 12.316935
## iter  70 value 12.228917
## iter  80 value 12.205813
## iter  90 value 12.185363
## iter 100 value 12.178172
## final  value 12.178172
```

```
## stopped after 100 iterations
## - Fold05: size=12, decay=0.05
## + Fold05: size=13, decay=0.05
## # weights:  261
## initial  value 116.882524
## iter  10 value 20.109094
## iter  20 value 14.217161
## iter  30 value 13.003114
## iter  40 value 12.611543
## iter  50 value 12.388616
## iter  60 value 12.350954
## iter  70 value 12.337218
## iter  80 value 12.330496
## iter  90 value 12.326601
## iter 100 value 12.321253
## final  value 12.321253
## stopped after 100 iterations
## - Fold05: size=13, decay=0.05
## + Fold05: size=14, decay=0.05
## # weights:  281
## initial  value 146.456368
## iter  10 value 26.158452
## iter  20 value 15.325445
## iter  30 value 13.026842
## iter  40 value 12.545703
## iter  50 value 12.456413
## iter  60 value 12.416130
## iter  70 value 12.220335
## iter  80 value 12.173853
## iter  90 value 12.161449
## iter 100 value 12.154605
## final  value 12.154605
## stopped after 100 iterations
## - Fold05: size=14, decay=0.05
## + Fold05: size=15, decay=0.05
## # weights:  301
## initial  value 116.963045
## iter  10 value 21.394938
## iter  20 value 14.209013
## iter  30 value 12.977691
## iter  40 value 12.588078
## iter  50 value 12.331528
## iter  60 value 12.186826
## iter  70 value 12.172775
## iter  80 value 12.164196
## iter  90 value 12.160251
## iter 100 value 12.158998
## final  value 12.158998
## stopped after 100 iterations
## - Fold05: size=15, decay=0.05
## + Fold05: size=16, decay=0.05
## # weights:  321
## initial  value 141.874026
## iter  10 value 39.320924
```

```
## iter  20 value 18.912670
## iter  30 value 14.434698
## iter  40 value 13.241197
## iter  50 value 12.761466
## iter  60 value 12.542738
## iter  70 value 12.246368
## iter  80 value 12.212780
## iter  90 value 12.205108
## iter 100 value 12.198196
## final  value 12.198196
## stopped after 100 iterations
## - Fold05: size=16, decay=0.05
## + Fold05: size=17, decay=0.05
## # weights:  341
## initial  value 123.844156
## iter  10 value 33.916188
## iter  20 value 18.365387
## iter  30 value 13.548204
## iter  40 value 12.735656
## iter  50 value 12.365756
## iter  60 value 12.232009
## iter  70 value 12.178421
## iter  80 value 12.156443
## iter  90 value 12.151953
## iter 100 value 12.149430
## final  value 12.149430
## stopped after 100 iterations
## - Fold05: size=17, decay=0.05
## + Fold05: size=18, decay=0.05
## # weights:  361
## initial  value 112.006158
## iter  10 value 24.172263
## iter  20 value 15.622797
## iter  30 value 12.830754
## iter  40 value 12.321630
## iter  50 value 12.210464
## iter  60 value 12.179861
## iter  70 value 12.142156
## iter  80 value 12.130754
## iter  90 value 12.128344
## iter 100 value 12.127267
## final  value 12.127267
## stopped after 100 iterations
## - Fold05: size=18, decay=0.05
## + Fold05: size=19, decay=0.05
## # weights:  381
## initial  value 148.386907
## iter  10 value 20.557108
## iter  20 value 13.682470
## iter  30 value 12.782500
## iter  40 value 12.379310
## iter  50 value 12.252869
## iter  60 value 12.223530
## iter  70 value 12.211647
```

```
## iter  80 value 12.206737
## iter  90 value 12.201115
## iter 100 value 12.197457
## final  value 12.197457
## stopped after 100 iterations
## - Fold05: size=19, decay=0.05
## + Fold05: size=20, decay=0.05
## # weights:  401
## initial  value 116.572950
## iter  10 value 19.205344
## iter  20 value 13.574059
## iter  30 value 12.657180
## iter  40 value 12.293802
## iter  50 value 12.247233
## iter  60 value 12.229043
## iter  70 value 12.176870
## iter  80 value 12.163721
## iter  90 value 12.160801
## iter 100 value 12.159129
## final  value 12.159129
## stopped after 100 iterations
## - Fold05: size=20, decay=0.05
## + Fold05: size= 1, decay=0.10
## # weights:  21
## initial  value 112.068734
## iter  10 value 47.787542
## iter  20 value 29.642820
## iter  30 value 28.808091
## final  value 28.807964
## converged
## - Fold05: size= 1, decay=0.10
## + Fold05: size= 2, decay=0.10
## # weights:  41
## initial  value 124.275007
## iter  10 value 39.425309
## iter  20 value 29.986719
## iter  30 value 24.339675
## iter  40 value 23.385496
## iter  50 value 23.336423
## iter  60 value 23.323818
## final  value 23.323808
## converged
## - Fold05: size= 2, decay=0.10
## + Fold05: size= 3, decay=0.10
## # weights:  61
## initial  value 121.777204
## iter  10 value 43.015620
## iter  20 value 26.705980
## iter  30 value 22.996112
## iter  40 value 21.770503
## iter  50 value 20.447468
## iter  60 value 20.173779
## iter  70 value 20.137128
## iter  80 value 20.136686
```

```
## final  value 20.136684
## converged
## - Fold05: size= 3, decay=0.10
## + Fold05: size= 4, decay=0.10
## # weights:  81
## initial  value 121.564885
## iter  10 value 32.452183
## iter  20 value 20.973147
## iter  30 value 20.267579
## iter  40 value 20.189667
## iter  50 value 20.187955
## final  value 20.187832
## converged
## - Fold05: size= 4, decay=0.10
## + Fold05: size= 5, decay=0.10
## # weights:  101
## initial  value 128.963742
## iter  10 value 34.389783
## iter  20 value 22.597880
## iter  30 value 20.558352
## iter  40 value 19.490160
## iter  50 value 19.351903
## iter  60 value 19.278533
## iter  70 value 19.266197
## iter  80 value 19.265345
## final  value 19.265339
## converged
## - Fold05: size= 5, decay=0.10
## + Fold05: size= 6, decay=0.10
## # weights:  121
## initial  value 108.452755
## iter  10 value 31.476314
## iter  20 value 21.227649
## iter  30 value 19.481954
## iter  40 value 18.925187
## iter  50 value 18.891676
## iter  60 value 18.889129
## iter  70 value 18.888827
## final  value 18.888820
## converged
## - Fold05: size= 6, decay=0.10
## + Fold05: size= 7, decay=0.10
## # weights:  141
## initial  value 146.982285
## iter  10 value 34.223199
## iter  20 value 22.159792
## iter  30 value 20.048193
## iter  40 value 19.454306
## iter  50 value 19.294738
## iter  60 value 19.217916
## iter  70 value 19.192202
## iter  80 value 19.126546
## iter  90 value 18.931732
## iter 100 value 18.883930
```

```
## final  value 18.883930
## stopped after 100 iterations
## - Fold05: size= 7, decay=0.10
## + Fold05: size= 8, decay=0.10
## # weights:  161
## initial  value 130.886836
## iter  10 value 35.028413
## iter  20 value 21.894608
## iter  30 value 20.041801
## iter  40 value 19.419724
## iter  50 value 19.215680
## iter  60 value 19.103953
## iter  70 value 19.089269
## iter  80 value 19.088014
## iter  90 value 19.087913
## final  value 19.087905
## converged
## - Fold05: size= 8, decay=0.10
## + Fold05: size= 9, decay=0.10
## # weights:  181
## initial  value 142.925019
## iter  10 value 26.643175
## iter  20 value 20.029625
## iter  30 value 19.460452
## iter  40 value 18.936102
## iter  50 value 18.730379
## iter  60 value 18.688096
## iter  70 value 18.663114
## iter  80 value 18.624786
## iter  90 value 18.620699
## iter 100 value 18.619627
## final  value 18.619627
## stopped after 100 iterations
## - Fold05: size= 9, decay=0.10
## + Fold05: size=10, decay=0.10
## # weights:  201
## initial  value 123.097675
## iter  10 value 23.342721
## iter  20 value 19.538897
## iter  30 value 18.957723
## iter  40 value 18.875332
## iter  50 value 18.815727
## iter  60 value 18.801600
## iter  70 value 18.778453
## iter  80 value 18.756542
## iter  90 value 18.753918
## iter 100 value 18.753638
## final  value 18.753638
## stopped after 100 iterations
## - Fold05: size=10, decay=0.10
## + Fold05: size=11, decay=0.10
## # weights:  221
## initial  value 118.702060
## iter  10 value 23.857315
```

```
## iter  20 value 19.894496
## iter  30 value 18.944594
## iter  40 value 18.701370
## iter  50 value 18.618666
## iter  60 value 18.605748
## iter  70 value 18.602519
## iter  80 value 18.602022
## iter  90 value 18.601994
## final  value 18.601989
## converged
## - Fold05: size=11, decay=0.10
## + Fold05: size=12, decay=0.10
## # weights:  241
## initial  value 157.906286
## iter  10 value 29.683209
## iter  20 value 21.069688
## iter  30 value 19.265222
## iter  40 value 18.939857
## iter  50 value 18.747034
## iter  60 value 18.627660
## iter  70 value 18.599141
## iter  80 value 18.586210
## iter  90 value 18.585074
## iter 100 value 18.584932
## final  value 18.584932
## stopped after 100 iterations
## - Fold05: size=12, decay=0.10
## + Fold05: size=13, decay=0.10
## # weights:  261
## initial  value 127.080438
## iter  10 value 41.829630
## iter  20 value 22.016252
## iter  30 value 19.967591
## iter  40 value 19.368091
## iter  50 value 19.002731
## iter  60 value 18.863958
## iter  70 value 18.800415
## iter  80 value 18.686894
## iter  90 value 18.605037
## iter 100 value 18.598829
## final  value 18.598829
## stopped after 100 iterations
## - Fold05: size=13, decay=0.10
## + Fold05: size=14, decay=0.10
## # weights:  281
## initial  value 106.268414
## iter  10 value 25.284525
## iter  20 value 19.810140
## iter  30 value 19.150771
## iter  40 value 18.905903
## iter  50 value 18.850753
## iter  60 value 18.789301
## iter  70 value 18.657036
## iter  80 value 18.596191
```

```
## iter  90 value 18.577923
## iter 100 value 18.575038
## final  value 18.575038
## stopped after 100 iterations
## - Fold05: size=14, decay=0.10
## + Fold05: size=15, decay=0.10
## # weights:  301
## initial  value 148.687675
## iter  10 value 22.818048
## iter  20 value 19.616286
## iter  30 value 18.998801
## iter  40 value 18.690458
## iter  50 value 18.625137
## iter  60 value 18.601420
## iter  70 value 18.586310
## iter  80 value 18.574614
## iter  90 value 18.568943
## iter 100 value 18.568311
## final  value 18.568311
## stopped after 100 iterations
## - Fold05: size=15, decay=0.10
## + Fold05: size=16, decay=0.10
## # weights:  321
## initial  value 122.570302
## iter  10 value 22.921286
## iter  20 value 19.385198
## iter  30 value 18.870334
## iter  40 value 18.667590
## iter  50 value 18.613138
## iter  60 value 18.586173
## iter  70 value 18.582148
## iter  80 value 18.581349
## iter  90 value 18.564411
## iter 100 value 18.559319
## final  value 18.559319
## stopped after 100 iterations
## - Fold05: size=16, decay=0.10
## + Fold05: size=17, decay=0.10
## # weights:  341
## initial  value 133.213117
## iter  10 value 27.324024
## iter  20 value 20.218970
## iter  30 value 19.377588
## iter  40 value 18.893379
## iter  50 value 18.798917
## iter  60 value 18.731894
## iter  70 value 18.708599
## iter  80 value 18.704208
## iter  90 value 18.703623
## iter 100 value 18.703480
## final  value 18.703480
## stopped after 100 iterations
## - Fold05: size=17, decay=0.10
## + Fold05: size=18, decay=0.10
```

```
## # weights:  361
## initial  value 185.039115
## iter  10 value 28.863919
## iter  20 value 20.468850
## iter  30 value 19.383932
## iter  40 value 18.933061
## iter  50 value 18.804360
## iter  60 value 18.658179
## iter  70 value 18.593288
## iter  80 value 18.575850
## iter  90 value 18.572692
## iter 100 value 18.567720
## final  value 18.567720
## stopped after 100 iterations
## - Fold05: size=18, decay=0.10
## + Fold05: size=19, decay=0.10
## # weights:  381
## initial  value 133.976644
## iter  10 value 25.563867
## iter  20 value 19.356527
## iter  30 value 18.787757
## iter  40 value 18.631736
## iter  50 value 18.591744
## iter  60 value 18.573460
## iter  70 value 18.566891
## iter  80 value 18.564887
## iter  90 value 18.562827
## iter 100 value 18.562387
## final  value 18.562387
## stopped after 100 iterations
## - Fold05: size=19, decay=0.10
## + Fold05: size=20, decay=0.10
## # weights:  401
## initial  value 141.274321
## iter  10 value 32.189572
## iter  20 value 19.717947
## iter  30 value 19.099193
## iter  40 value 18.839372
## iter  50 value 18.782411
## iter  60 value 18.753780
## iter  70 value 18.730850
## iter  80 value 18.699236
## iter  90 value 18.690723
## iter 100 value 18.602723
## final  value 18.602723
## stopped after 100 iterations
## - Fold05: size=20, decay=0.10
## + Fold06: size= 1, decay=0.00
## # weights:  21
## initial  value 124.878601
## iter  10 value 41.932525
## iter  20 value 26.904536
## iter  30 value 19.923853
## iter  40 value 17.555489
```

```
## iter  50 value 13.133018
## iter  60 value 13.053563
## iter  70 value 13.033893
## iter  80 value 13.007650
## iter  90 value 9.634231
## iter 100 value 9.505309
## final  value 9.505309
## stopped after 100 iterations
## - Fold06: size= 1, decay=0.00
## + Fold06: size= 2, decay=0.00
## # weights:  41
## initial  value 116.970375
## iter  10 value 18.689175
## iter  20 value 11.836233
## iter  30 value 10.973707
## iter  40 value 10.366629
## iter  50 value 10.364227
## iter  60 value 9.707737
## iter  70 value 9.704551
## iter  80 value 9.703969
## iter  90 value 8.977507
## iter 100 value 8.972742
## final  value 8.972742
## stopped after 100 iterations
## - Fold06: size= 2, decay=0.00
## + Fold06: size= 3, decay=0.00
## # weights:  61
## initial  value 121.223224
## iter  10 value 17.497697
## iter  20 value 9.342466
## iter  30 value 6.500905
## iter  40 value 6.174101
## iter  50 value 5.488856
## iter  60 value 5.056036
## iter  70 value 5.005038
## iter  80 value 5.004662
## iter  90 value 5.004421
## iter 100 value 5.004249
## final  value 5.004249
## stopped after 100 iterations
## - Fold06: size= 3, decay=0.00
## + Fold06: size= 4, decay=0.00
## # weights:  81
## initial  value 115.929546
## iter  10 value 8.779304
## iter  20 value 3.080463
## iter  30 value 1.917893
## iter  40 value 1.911575
## iter  50 value 1.909944
## iter  60 value 1.909640
## iter  70 value 1.909564
## iter  80 value 1.909550
## final  value 1.909543
## converged
```

```
## - Fold06: size= 4, decay=0.00
## + Fold06: size= 5, decay=0.00
## # weights:  101
## initial  value 113.625232
## iter  10 value 19.700303
## iter  20 value 6.900729
## iter  30 value 3.143288
## iter  40 value 2.846658
## iter  50 value 2.815111
## iter  60 value 2.804166
## iter  70 value 2.789490
## iter  80 value 2.779649
## iter  90 value 2.776631
## iter 100 value 2.775493
## final  value 2.775493
## stopped after 100 iterations
## - Fold06: size= 5, decay=0.00
## + Fold06: size= 6, decay=0.00
## # weights:  121
## initial  value 130.273237
## iter  10 value 24.352634
## iter  20 value 7.842591
## iter  30 value 2.827236
## iter  40 value 0.134389
## iter  50 value 0.038313
## iter  60 value 0.019334
## iter  70 value 0.003203
## iter  80 value 0.001144
## iter  90 value 0.000524
## iter 100 value 0.000299
## final  value 0.000299
## stopped after 100 iterations
## - Fold06: size= 6, decay=0.00
## + Fold06: size= 7, decay=0.00
## # weights:  141
## initial  value 114.449482
## iter  10 value 13.747169
## iter  20 value 0.769105
## iter  30 value 0.019760
## iter  40 value 0.000323
## final  value 0.000099
## converged
## - Fold06: size= 7, decay=0.00
## + Fold06: size= 8, decay=0.00
## # weights:  161
## initial  value 130.237937
## iter  10 value 12.986391
## iter  20 value 2.598416
## iter  30 value 0.224150
## iter  40 value 0.028755
## iter  50 value 0.008547
## iter  60 value 0.003799
## iter  70 value 0.001362
## iter  80 value 0.000687
```

```
## iter  90 value 0.000324
## iter 100 value 0.000270
## final  value 0.000270
## stopped after 100 iterations
## - Fold06: size= 8, decay=0.00
## + Fold06: size= 9, decay=0.00
## # weights:  181
## initial  value 131.878676
## iter  10 value 11.677639
## iter  20 value 3.076739
## iter  30 value 0.115379
## iter  40 value 0.028222
## iter  50 value 0.004253
## iter  60 value 0.001754
## iter  70 value 0.001056
## iter  80 value 0.000236
## iter  90 value 0.000112
## final  value 0.000093
## converged
## - Fold06: size= 9, decay=0.00
## + Fold06: size=10, decay=0.00
## # weights:  201
## initial  value 156.863724
## iter  10 value 12.459991
## iter  20 value 0.271990
## iter  30 value 0.005347
## iter  40 value 0.000712
## iter  50 value 0.000149
## final  value 0.000096
## converged
## - Fold06: size=10, decay=0.00
## + Fold06: size=11, decay=0.00
## # weights:  221
## initial  value 115.878350
## iter  10 value 11.300099
## iter  20 value 0.150361
## iter  30 value 0.001078
## iter  40 value 0.000112
## iter  40 value 0.000099
## iter  40 value 0.000099
## final  value 0.000099
## converged
## - Fold06: size=11, decay=0.00
## + Fold06: size=12, decay=0.00
## # weights:  241
## initial  value 145.423913
## iter  10 value 13.788276
## iter  20 value 1.334811
## iter  30 value 0.006020
## iter  40 value 0.000546
## final  value 0.000086
## converged
## - Fold06: size=12, decay=0.00
## + Fold06: size=13, decay=0.00
```

```
## # weights:  261
## initial  value 153.057157
## iter  10 value 9.855309
## iter  20 value 0.441565
## iter  30 value 0.008352
## iter  40 value 0.000504
## iter  50 value 0.000114
## iter  50 value 0.000091
## iter  50 value 0.000091
## final  value 0.000091
## converged
## - Fold06: size=13, decay=0.00
## + Fold06: size=14, decay=0.00
## # weights:  281
## initial  value 134.208009
## iter  10 value 8.095222
## iter  20 value 0.145990
## iter  30 value 0.006406
## iter  40 value 0.001005
## iter  50 value 0.000142
## final  value 0.000091
## converged
## - Fold06: size=14, decay=0.00
## + Fold06: size=15, decay=0.00
## # weights:  301
## initial  value 134.062232
## iter  10 value 9.896281
## iter  20 value 0.250637
## iter  30 value 0.006628
## iter  40 value 0.000607
## final  value 0.000093
## converged
## - Fold06: size=15, decay=0.00
## + Fold06: size=16, decay=0.00
## # weights:  321
## initial  value 190.496492
## iter  10 value 13.761164
## iter  20 value 0.466179
## iter  30 value 0.008122
## iter  40 value 0.000756
## final  value 0.000082
## converged
## - Fold06: size=16, decay=0.00
## + Fold06: size=17, decay=0.00
## # weights:  341
## initial  value 116.002246
## iter  10 value 10.250660
## iter  20 value 0.091811
## iter  30 value 0.001736
## final  value 0.000082
## converged
## - Fold06: size=17, decay=0.00
## + Fold06: size=18, decay=0.00
## # weights:  361
```

```
## initial  value 119.797101
## iter  10 value 5.948907
## iter  20 value 0.095004
## iter  30 value 0.006510
## iter  40 value 0.000847
## iter  50 value 0.000243
## iter  60 value 0.000113
## iter  60 value 0.000080
## iter  60 value 0.000080
## final  value 0.000080
## converged
## - Fold06: size=18, decay=0.00
## + Fold06: size=19, decay=0.00
## # weights:  381
## initial  value 190.783743
## iter  10 value 11.444264
## iter  20 value 0.193428
## iter  30 value 0.006250
## iter  40 value 0.000405
## iter  50 value 0.000115
## iter  50 value 0.000083
## iter  50 value 0.000082
## final  value 0.000082
## converged
## - Fold06: size=19, decay=0.00
## + Fold06: size=20, decay=0.00
## # weights:  401
## initial  value 130.093214
## iter  10 value 8.851671
## iter  20 value 0.075580
## iter  30 value 0.000605
## final  value 0.000095
## converged
## - Fold06: size=20, decay=0.00
## + Fold06: size= 1, decay=0.05
## # weights:  21
## initial  value 125.783541
## iter  10 value 50.093194
## iter  20 value 22.261322
## iter  30 value 20.135994
## iter  40 value 20.046895
## final  value 20.046894
## converged
## - Fold06: size= 1, decay=0.05
## + Fold06: size= 2, decay=0.05
## # weights:  41
## initial  value 127.475527
## iter  10 value 28.897966
## iter  20 value 16.813048
## iter  30 value 14.928463
## iter  40 value 14.595579
## iter  50 value 14.520662
## final  value 14.520644
## converged
```

```
## - Fold06: size= 2, decay=0.05
## + Fold06: size= 3, decay=0.05
## # weights:  61
## initial  value 116.141622
## iter  10 value 19.522497
## iter  20 value 15.301445
## iter  30 value 14.641758
## iter  40 value 14.508280
## iter  50 value 14.475772
## iter  60 value 14.468795
## iter  70 value 14.467733
## final  value 14.467729
## converged
## - Fold06: size= 3, decay=0.05
## + Fold06: size= 4, decay=0.05
## # weights:  81
## initial  value 119.112141
## iter  10 value 37.327786
## iter  20 value 18.294729
## iter  30 value 15.251667
## iter  40 value 14.278489
## iter  50 value 13.597171
## iter  60 value 13.544298
## iter  70 value 13.195249
## iter  80 value 13.101437
## iter  90 value 13.085841
## iter 100 value 13.085076
## final  value 13.085076
## stopped after 100 iterations
## - Fold06: size= 4, decay=0.05
## + Fold06: size= 5, decay=0.05
## # weights:  101
## initial  value 121.432056
## iter  10 value 18.102567
## iter  20 value 13.643408
## iter  30 value 12.390486
## iter  40 value 12.201734
## iter  50 value 12.068178
## iter  60 value 12.002186
## iter  70 value 11.986196
## iter  80 value 11.975862
## iter  90 value 11.972408
## iter 100 value 11.971930
## final  value 11.971930
## stopped after 100 iterations
## - Fold06: size= 5, decay=0.05
## + Fold06: size= 6, decay=0.05
## # weights:  121
## initial  value 116.310906
## iter  10 value 20.943329
## iter  20 value 14.146265
## iter  30 value 12.298333
## iter  40 value 11.818663
## iter  50 value 11.685539
```

```
## iter  60 value 11.671484
## iter  70 value 11.670495
## iter  80 value 11.670441
## iter  90 value 11.670433
## final  value 11.670432
## converged
## - Fold06: size= 6, decay=0.05
## + Fold06: size= 7, decay=0.05
## # weights:  141
## initial  value 124.757093
## iter  10 value 18.925176
## iter  20 value 13.618704
## iter  30 value 12.276038
## iter  40 value 11.891040
## iter  50 value 11.810040
## iter  60 value 11.735933
## iter  70 value 11.576338
## iter  80 value 11.525408
## iter  90 value 11.520064
## iter 100 value 11.519589
## final  value 11.519589
## stopped after 100 iterations
## - Fold06: size= 7, decay=0.05
## + Fold06: size= 8, decay=0.05
## # weights:  161
## initial  value 131.871192
## iter  10 value 23.689247
## iter  20 value 13.785558
## iter  30 value 12.076466
## iter  40 value 11.851394
## iter  50 value 11.773830
## iter  60 value 11.516329
## iter  70 value 11.415446
## iter  80 value 11.397277
## iter  90 value 11.381558
## iter 100 value 11.379833
## final  value 11.379833
## stopped after 100 iterations
## - Fold06: size= 8, decay=0.05
## + Fold06: size= 9, decay=0.05
## # weights:  181
## initial  value 114.709243
## iter  10 value 32.949519
## iter  20 value 16.541831
## iter  30 value 12.787652
## iter  40 value 11.715569
## iter  50 value 11.498574
## iter  60 value 11.420176
## iter  70 value 11.408368
## iter  80 value 11.390268
## iter  90 value 11.342395
## iter 100 value 11.322783
## final  value 11.322783
## stopped after 100 iterations
```

```
## - Fold06: size= 9, decay=0.05
## + Fold06: size=10, decay=0.05
## # weights:  201
## initial  value 114.283298
## iter  10 value 20.216425
## iter  20 value 13.196583
## iter  30 value 11.656086
## iter  40 value 11.368035
## iter  50 value 11.254929
## iter  60 value 11.243642
## iter  70 value 11.220912
## iter  80 value 11.209098
## iter  90 value 11.184911
## iter 100 value 11.179667
## final  value 11.179667
## stopped after 100 iterations
## - Fold06: size=10, decay=0.05
## + Fold06: size=11, decay=0.05
## # weights:  221
## initial  value 130.411272
## iter  10 value 23.158624
## iter  20 value 13.529854
## iter  30 value 11.871387
## iter  40 value 11.536002
## iter  50 value 11.336189
## iter  60 value 11.254998
## iter  70 value 11.190548
## iter  80 value 11.138049
## iter  90 value 11.094599
## iter 100 value 11.067796
## final  value 11.067796
## stopped after 100 iterations
## - Fold06: size=11, decay=0.05
## + Fold06: size=12, decay=0.05
## # weights:  241
## initial  value 114.516288
## iter  10 value 18.173700
## iter  20 value 12.921319
## iter  30 value 11.735485
## iter  40 value 11.494509
## iter  50 value 11.428612
## iter  60 value 11.410161
## iter  70 value 11.373713
## iter  80 value 11.352390
## iter  90 value 11.327246
## iter 100 value 11.269440
## final  value 11.269440
## stopped after 100 iterations
## - Fold06: size=12, decay=0.05
## + Fold06: size=13, decay=0.05
## # weights:  261
## initial  value 180.979766
## iter  10 value 17.713138
## iter  20 value 12.268815
```

```
## iter  30 value 11.467878
## iter  40 value 11.265046
## iter  50 value 11.182704
## iter  60 value 11.165375
## iter  70 value 11.148510
## iter  80 value 11.144044
## iter  90 value 11.130994
## iter 100 value 11.062683
## final  value 11.062683
## stopped after 100 iterations
## - Fold06: size=13, decay=0.05
## + Fold06: size=14, decay=0.05
## # weights:  281
## initial  value 120.930148
## iter  10 value 23.338611
## iter  20 value 13.376326
## iter  30 value 11.823878
## iter  40 value 11.389579
## iter  50 value 11.264728
## iter  60 value 11.230942
## iter  70 value 11.165160
## iter  80 value 11.148661
## iter  90 value 11.126993
## iter 100 value 11.108112
## final  value 11.108112
## stopped after 100 iterations
## - Fold06: size=14, decay=0.05
## + Fold06: size=15, decay=0.05
## # weights:  301
## initial  value 150.213306
## iter  10 value 20.932639
## iter  20 value 13.785513
## iter  30 value 11.926580
## iter  40 value 11.395474
## iter  50 value 11.247929
## iter  60 value 11.195910
## iter  70 value 11.169519
## iter  80 value 11.151505
## iter  90 value 11.126704
## iter 100 value 11.121052
## final  value 11.121052
## stopped after 100 iterations
## - Fold06: size=15, decay=0.05
## + Fold06: size=16, decay=0.05
## # weights:  321
## initial  value 176.717762
## iter  10 value 23.679329
## iter  20 value 14.209497
## iter  30 value 11.895460
## iter  40 value 11.394917
## iter  50 value 11.271261
## iter  60 value 11.238192
## iter  70 value 11.185972
## iter  80 value 11.167288
```

```
## iter  90 value 11.155700
## iter 100 value 11.150528
## final  value 11.150528
## stopped after 100 iterations
## - Fold06: size=16, decay=0.05
## + Fold06: size=17, decay=0.05
## # weights:  341
## initial  value 133.561729
## iter  10 value 18.751461
## iter  20 value 12.739932
## iter  30 value 11.665338
## iter  40 value 11.388286
## iter  50 value 11.234720
## iter  60 value 11.159265
## iter  70 value 11.075614
## iter  80 value 11.055191
## iter  90 value 11.042275
## iter 100 value 11.033083
## final  value 11.033083
## stopped after 100 iterations
## - Fold06: size=17, decay=0.05
## + Fold06: size=18, decay=0.05
## # weights:  361
## initial  value 120.566712
## iter  10 value 22.510212
## iter  20 value 14.128112
## iter  30 value 11.821112
## iter  40 value 11.373528
## iter  50 value 11.235671
## iter  60 value 11.133147
## iter  70 value 11.077330
## iter  80 value 11.064577
## iter  90 value 11.046467
## iter 100 value 11.036828
## final  value 11.036828
## stopped after 100 iterations
## - Fold06: size=18, decay=0.05
## + Fold06: size=19, decay=0.05
## # weights:  381
## initial  value 134.141271
## iter  10 value 24.285416
## iter  20 value 14.456732
## iter  30 value 11.775023
## iter  40 value 11.291032
## iter  50 value 11.190813
## iter  60 value 11.129683
## iter  70 value 11.065854
## iter  80 value 11.039736
## iter  90 value 11.032999
## iter 100 value 11.030186
## final  value 11.030186
## stopped after 100 iterations
## - Fold06: size=19, decay=0.05
## + Fold06: size=20, decay=0.05
```

```
## # weights:  401
## initial  value 126.508352
## iter  10 value 19.547807
## iter  20 value 12.685196
## iter  30 value 11.530461
## iter  40 value 11.244373
## iter  50 value 11.166366
## iter  60 value 11.108004
## iter  70 value 11.024023
## iter  80 value 11.015998
## iter  90 value 11.013689
## iter 100 value 11.011106
## final  value 11.011106
## stopped after 100 iterations
## - Fold06: size=20, decay=0.05
## + Fold06: size= 1, decay=0.10
## # weights:  21
## initial  value 118.983552
## iter  10 value 35.325301
## iter  20 value 26.360048
## iter  30 value 25.841680
## final  value 25.841667
## converged
## - Fold06: size= 1, decay=0.10
## + Fold06: size= 2, decay=0.10
## # weights:  41
## initial  value 118.703056
## iter  10 value 25.752126
## iter  20 value 22.516773
## iter  30 value 22.147928
## iter  40 value 21.098686
## iter  50 value 20.607920
## iter  60 value 20.604658
## iter  60 value 20.604658
## iter  60 value 20.604658
## final  value 20.604658
## converged
## - Fold06: size= 2, decay=0.10
## + Fold06: size= 3, decay=0.10
## # weights:  61
## initial  value 129.274026
## iter  10 value 46.260871
## iter  20 value 21.348074
## iter  30 value 20.380082
## iter  40 value 19.606230
## iter  50 value 19.300881
## iter  60 value 19.281817
## iter  70 value 19.281600
## final  value 19.281598
## converged
## - Fold06: size= 3, decay=0.10
## + Fold06: size= 4, decay=0.10
## # weights:  81
## initial  value 131.577675
```

```
## iter  10 value 24.051119
## iter  20 value 20.042969
## iter  30 value 19.595224
## iter  40 value 19.429709
## iter  50 value 19.293918
## iter  60 value 19.253669
## iter  70 value 19.236233
## iter  80 value 19.229991
## iter  90 value 19.229976
## final  value 19.229976
## converged
## - Fold06: size= 4, decay=0.10
## + Fold06: size= 5, decay=0.10
## # weights:  101
## initial  value 107.813013
## iter  10 value 25.808862
## iter  20 value 20.000607
## iter  30 value 19.239098
## iter  40 value 18.494221
## iter  50 value 18.229092
## iter  60 value 18.094403
## iter  70 value 18.092730
## final  value 18.092726
## converged
## - Fold06: size= 5, decay=0.10
## + Fold06: size= 6, decay=0.10
## # weights:  121
## initial  value 126.481011
## iter  10 value 24.505624
## iter  20 value 19.787812
## iter  30 value 18.584198
## iter  40 value 18.293979
## iter  50 value 17.951739
## iter  60 value 17.895878
## iter  70 value 17.852281
## iter  80 value 17.849958
## iter  90 value 17.849749
## iter 100 value 17.849735
## final  value 17.849735
## stopped after 100 iterations
## - Fold06: size= 6, decay=0.10
## + Fold06: size= 7, decay=0.10
## # weights:  141
## initial  value 124.798613
## iter  10 value 27.862095
## iter  20 value 19.877045
## iter  30 value 18.185592
## iter  40 value 17.803755
## iter  50 value 17.723273
## iter  60 value 17.695870
## iter  70 value 17.690777
## iter  80 value 17.690459
## iter  90 value 17.688670
## iter 100 value 17.683868
```

```
## final  value 17.683868
## stopped after 100 iterations
## - Fold06: size= 7, decay=0.10
## + Fold06: size= 8, decay=0.10
## # weights:  161
## initial  value 129.117250
## iter  10 value 25.996962
## iter  20 value 19.540137
## iter  30 value 18.222932
## iter  40 value 17.891915
## iter  50 value 17.739174
## iter  60 value 17.650540
## iter  70 value 17.554140
## iter  80 value 17.450472
## iter  90 value 17.441044
## iter 100 value 17.440296
## final  value 17.440296
## stopped after 100 iterations
## - Fold06: size= 8, decay=0.10
## + Fold06: size= 9, decay=0.10
## # weights:  181
## initial  value 124.062444
## iter  10 value 20.724259
## iter  20 value 18.088628
## iter  30 value 17.736636
## iter  40 value 17.621161
## iter  50 value 17.593803
## iter  60 value 17.564590
## iter  70 value 17.518223
## iter  80 value 17.479153
## iter  90 value 17.472919
## iter 100 value 17.472565
## final  value 17.472565
## stopped after 100 iterations
## - Fold06: size= 9, decay=0.10
## + Fold06: size=10, decay=0.10
## # weights:  201
## initial  value 134.162322
## iter  10 value 24.567641
## iter  20 value 19.087096
## iter  30 value 17.954746
## iter  40 value 17.690930
## iter  50 value 17.597743
## iter  60 value 17.586836
## iter  70 value 17.585816
## iter  80 value 17.585382
## iter  90 value 17.584768
## iter 100 value 17.584177
## final  value 17.584177
## stopped after 100 iterations
## - Fold06: size=10, decay=0.10
## + Fold06: size=11, decay=0.10
## # weights:  221
## initial  value 126.126615
```

```
## iter  10 value 27.204583
## iter  20 value 19.031146
## iter  30 value 17.849147
## iter  40 value 17.536084
## iter  50 value 17.491296
## iter  60 value 17.469727
## iter  70 value 17.457677
## iter  80 value 17.446744
## iter  90 value 17.443271
## iter 100 value 17.443128
## final  value 17.443128
## stopped after 100 iterations
## - Fold06: size=11, decay=0.10
## + Fold06: size=12, decay=0.10
## # weights:  241
## initial  value 130.269866
## iter  10 value 37.034856
## iter  20 value 20.685777
## iter  30 value 18.673410
## iter  40 value 17.984390
## iter  50 value 17.719250
## iter  60 value 17.581563
## iter  70 value 17.553302
## iter  80 value 17.548876
## iter  90 value 17.548179
## iter 100 value 17.548096
## final  value 17.548096
## stopped after 100 iterations
## - Fold06: size=12, decay=0.10
## + Fold06: size=13, decay=0.10
## # weights:  261
## initial  value 130.496184
## iter  10 value 30.777596
## iter  20 value 19.646251
## iter  30 value 17.949116
## iter  40 value 17.576316
## iter  50 value 17.501816
## iter  60 value 17.474332
## iter  70 value 17.465707
## iter  80 value 17.461053
## iter  90 value 17.459745
## iter 100 value 17.459487
## final  value 17.459487
## stopped after 100 iterations
## - Fold06: size=13, decay=0.10
## + Fold06: size=14, decay=0.10
## # weights:  281
## initial  value 124.072489
## iter  10 value 25.004081
## iter  20 value 18.868751
## iter  30 value 18.138575
## iter  40 value 17.932943
## iter  50 value 17.712359
## iter  60 value 17.592632
```

```
## iter  70 value 17.496580
## iter  80 value 17.478001
## iter  90 value 17.472839
## iter 100 value 17.470065
## final  value 17.470065
## stopped after 100 iterations
## - Fold06: size=14, decay=0.10
## + Fold06: size=15, decay=0.10
## # weights:  301
## initial  value 148.973434
## iter  10 value 42.476892
## iter  20 value 20.555083
## iter  30 value 18.363989
## iter  40 value 17.796826
## iter  50 value 17.687104
## iter  60 value 17.599142
## iter  70 value 17.582699
## iter  80 value 17.575673
## iter  90 value 17.574333
## iter 100 value 17.573772
## final  value 17.573772
## stopped after 100 iterations
## - Fold06: size=15, decay=0.10
## + Fold06: size=16, decay=0.10
## # weights:  321
## initial  value 133.723114
## iter  10 value 26.658001
## iter  20 value 18.585802
## iter  30 value 17.901994
## iter  40 value 17.592509
## iter  50 value 17.511636
## iter  60 value 17.492463
## iter  70 value 17.490263
## iter  80 value 17.487816
## iter  90 value 17.483905
## iter 100 value 17.464760
## final  value 17.464760
## stopped after 100 iterations
## - Fold06: size=16, decay=0.10
## + Fold06: size=17, decay=0.10
## # weights:  341
## initial  value 155.305083
## iter  10 value 26.904059
## iter  20 value 18.673181
## iter  30 value 17.895763
## iter  40 value 17.672781
## iter  50 value 17.533938
## iter  60 value 17.457043
## iter  70 value 17.436667
## iter  80 value 17.425525
## iter  90 value 17.418318
## iter 100 value 17.417947
## final  value 17.417947
## stopped after 100 iterations
```

```
## - Fold06: size=17, decay=0.10
## + Fold06: size=18, decay=0.10
## # weights:  361
## initial  value 146.636336
## iter  10 value 27.855308
## iter  20 value 18.550168
## iter  30 value 17.766468
## iter  40 value 17.578998
## iter  50 value 17.463505
## iter  60 value 17.439127
## iter  70 value 17.433300
## iter  80 value 17.430879
## iter  90 value 17.430640
## iter 100 value 17.430535
## final  value 17.430535
## stopped after 100 iterations
## - Fold06: size=18, decay=0.10
## + Fold06: size=19, decay=0.10
## # weights:  381
## initial  value 139.288230
## iter  10 value 23.052191
## iter  20 value 18.114153
## iter  30 value 17.711499
## iter  40 value 17.524524
## iter  50 value 17.474021
## iter  60 value 17.447966
## iter  70 value 17.418288
## iter  80 value 17.412444
## iter  90 value 17.410849
## iter 100 value 17.409697
## final  value 17.409697
## stopped after 100 iterations
## - Fold06: size=19, decay=0.10
## + Fold06: size=20, decay=0.10
## # weights:  401
## initial  value 135.427176
## iter  10 value 35.105089
## iter  20 value 20.177884
## iter  30 value 17.957955
## iter  40 value 17.649416
## iter  50 value 17.531560
## iter  60 value 17.447038
## iter  70 value 17.404904
## iter  80 value 17.386933
## iter  90 value 17.381339
## iter 100 value 17.379485
## final  value 17.379485
## stopped after 100 iterations
## - Fold06: size=20, decay=0.10
## + Fold07: size= 1, decay=0.00
## # weights:  21
## initial  value 118.229254
## iter  10 value 35.868107
## iter  20 value 19.308367
```

```
## iter  30 value 16.487569
## iter  40 value 14.567970
## iter  50 value 13.125235
## iter  60 value 13.056790
## iter  70 value 13.053760
## iter  80 value 13.053253
## iter  90 value 13.053131
## iter 100 value 13.052590
## final  value 13.052590
## stopped after 100 iterations
## - Fold07: size= 1, decay=0.00
## + Fold07: size= 2, decay=0.00
## # weights:  41
## initial  value 140.074553
## iter  10 value 33.669717
## iter  20 value 27.116912
## iter  30 value 24.884905
## iter  40 value 22.522363
## iter  50 value 18.725236
## iter  60 value 15.498168
## iter  70 value 14.226358
## iter  80 value 14.106748
## iter  90 value 13.444277
## iter 100 value 13.063118
## final  value 13.063118
## stopped after 100 iterations
## - Fold07: size= 2, decay=0.00
## + Fold07: size= 3, decay=0.00
## # weights:  61
## initial  value 120.204810
## iter  10 value 15.714764
## iter  20 value 2.395944
## iter  30 value 1.923915
## iter  40 value 1.910711
## iter  50 value 1.909644
## iter  60 value 1.909567
## iter  70 value 1.909559
## final  value 1.909559
## converged
## - Fold07: size= 3, decay=0.00
## + Fold07: size= 4, decay=0.00
## # weights:  81
## initial  value 150.327776
## iter  10 value 12.688066
## iter  20 value 3.528372
## iter  30 value 3.134299
## iter  40 value 3.015936
## iter  50 value 3.014456
## iter  60 value 3.014267
## iter  70 value 3.014249
## iter  80 value 3.014213
## final  value 3.014173
## converged
## - Fold07: size= 4, decay=0.00
```

```
## + Fold07: size= 5, decay=0.00
## # weights:  101
## initial  value 103.596365
## iter  10 value 13.694323
## iter  20 value 2.925365
## iter  30 value 2.705185
## iter  40 value 2.703442
## iter  50 value 2.703380
## iter  60 value 2.703372
## final  value 2.703371
## converged
## - Fold07: size= 5, decay=0.00
## + Fold07: size= 6, decay=0.00
## # weights:  121
## initial  value 115.316379
## iter  10 value 25.264906
## iter  20 value 8.245242
## iter  30 value 5.251360
## iter  40 value 2.212719
## iter  50 value 0.083818
## iter  60 value 0.005685
## iter  70 value 0.001246
## final  value 0.000095
## converged
## - Fold07: size= 6, decay=0.00
## + Fold07: size= 7, decay=0.00
## # weights:  141
## initial  value 174.627645
## iter  10 value 11.301461
## iter  20 value 3.690728
## iter  30 value 2.932350
## iter  40 value 2.885084
## iter  50 value 2.873402
## iter  60 value 2.871144
## iter  70 value 2.871011
## iter  80 value 2.870917
## iter  90 value 2.870836
## final  value 2.870829
## converged
## - Fold07: size= 7, decay=0.00
## + Fold07: size= 8, decay=0.00
## # weights:  161
## initial  value 129.295212
## iter  10 value 15.143738
## iter  20 value 1.014702
## iter  30 value 0.016865
## iter  40 value 0.002048
## final  value 0.000098
## converged
## - Fold07: size= 8, decay=0.00
## + Fold07: size= 9, decay=0.00
## # weights:  181
## initial  value 112.416093
## iter  10 value 14.560365
```

```
## iter  20 value 1.146347
## iter  30 value 0.022858
## iter  40 value 0.000651
## iter  50 value 0.000241
## final  value 0.000063
## converged
## - Fold07: size= 9, decay=0.00
## + Fold07: size=10, decay=0.00
## # weights:  201
## initial  value 127.553804
## iter  10 value 11.695531
## iter  20 value 0.580971
## iter  30 value 0.011390
## iter  40 value 0.000101
## iter  40 value 0.000047
## iter  40 value 0.000047
## final  value 0.000047
## converged
## - Fold07: size=10, decay=0.00
## + Fold07: size=11, decay=0.00
## # weights:  221
## initial  value 109.171225
## iter  10 value 11.421918
## iter  20 value 0.384213
## iter  30 value 0.004033
## iter  40 value 0.000131
## final  value 0.000085
## converged
## - Fold07: size=11, decay=0.00
## + Fold07: size=12, decay=0.00
## # weights:  241
## initial  value 110.212650
## iter  10 value 12.604134
## iter  20 value 0.632192
## iter  30 value 0.021959
## iter  40 value 0.003907
## iter  50 value 0.000888
## iter  60 value 0.000315
## iter  70 value 0.000101
## final  value 0.000096
## converged
## - Fold07: size=12, decay=0.00
## + Fold07: size=13, decay=0.00
## # weights:  261
## initial  value 167.625571
## iter  10 value 13.867542
## iter  20 value 1.023547
## iter  30 value 0.007051
## final  value 0.000062
## converged
## - Fold07: size=13, decay=0.00
## + Fold07: size=14, decay=0.00
## # weights:  281
## initial  value 114.180616
```

```
## iter  10 value 15.003475
## iter  20 value 1.005874
## iter  30 value 0.024362
## iter  40 value 0.005608
## iter  50 value 0.001217
## iter  60 value 0.000485
## iter  70 value 0.000138
## final  value 0.000079
## converged
## - Fold07: size=14, decay=0.00
## + Fold07: size=15, decay=0.00
## # weights:  301
## initial  value 98.018681
## iter  10 value 11.687172
## iter  20 value 0.471143
## iter  30 value 0.012153
## iter  40 value 0.000475
## iter  50 value 0.000259
## final  value 0.000080
## converged
## - Fold07: size=15, decay=0.00
## + Fold07: size=16, decay=0.00
## # weights:  321
## initial  value 123.733887
## iter  10 value 12.233993
## iter  20 value 0.671990
## iter  30 value 0.007190
## iter  40 value 0.000519
## final  value 0.000054
## converged
## - Fold07: size=16, decay=0.00
## + Fold07: size=17, decay=0.00
## # weights:  341
## initial  value 241.828315
## iter  10 value 12.793973
## iter  20 value 0.528152
## iter  30 value 0.006309
## iter  40 value 0.000559
## final  value 0.000095
## converged
## - Fold07: size=17, decay=0.00
## + Fold07: size=18, decay=0.00
## # weights:  361
## initial  value 139.055443
## iter  10 value 13.923624
## iter  20 value 0.408919
## iter  30 value 0.007391
## iter  40 value 0.000190
## final  value 0.000098
## converged
## - Fold07: size=18, decay=0.00
## + Fold07: size=19, decay=0.00
## # weights:  381
## initial  value 130.734457
```

```
## iter  10 value 13.600817
## iter  20 value 0.574772
## iter  30 value 0.005151
## final  value 0.000073
## converged
## - Fold07: size=19, decay=0.00
## + Fold07: size=20, decay=0.00
## # weights:  401
## initial  value 126.427254
## iter  10 value 12.594501
## iter  20 value 0.243113
## iter  30 value 0.001660
## final  value 0.000077
## converged
## - Fold07: size=20, decay=0.00
## + Fold07: size= 1, decay=0.05
## # weights:  21
## initial  value 117.879024
## iter  10 value 33.878848
## iter  20 value 25.999326
## iter  30 value 25.105656
## iter  40 value 25.092487
## final  value 25.092487
## converged
## - Fold07: size= 1, decay=0.05
## + Fold07: size= 2, decay=0.05
## # weights:  41
## initial  value 121.519309
## iter  10 value 29.431875
## iter  20 value 19.323411
## iter  30 value 18.395198
## iter  40 value 18.391936
## final  value 18.391773
## converged
## - Fold07: size= 2, decay=0.05
## + Fold07: size= 3, decay=0.05
## # weights:  61
## initial  value 111.631598
## iter  10 value 36.835961
## iter  20 value 19.741283
## iter  30 value 15.687084
## iter  40 value 15.497389
## iter  50 value 15.453293
## iter  60 value 15.453035
## final  value 15.453032
## converged
## - Fold07: size= 3, decay=0.05
## + Fold07: size= 4, decay=0.05
## # weights:  81
## initial  value 119.023469
## iter  10 value 20.477850
## iter  20 value 16.446104
## iter  30 value 15.479267
## iter  40 value 14.996296
```

```
## iter  50 value 14.796196
## iter  60 value 14.753092
## iter  70 value 14.076389
## iter  80 value 13.934090
## iter  90 value 13.927747
## iter 100 value 13.927067
## final  value 13.927067
## stopped after 100 iterations
## - Fold07: size= 4, decay=0.05
## + Fold07: size= 5, decay=0.05
## # weights:  101
## initial  value 112.427805
## iter  10 value 21.965361
## iter  20 value 16.334641
## iter  30 value 14.625474
## iter  40 value 14.011100
## iter  50 value 13.686390
## iter  60 value 13.531361
## iter  70 value 13.471455
## iter  80 value 13.470898
## final  value 13.470896
## converged
## - Fold07: size= 5, decay=0.05
## + Fold07: size= 6, decay=0.05
## # weights:  121
## initial  value 124.066607
## iter  10 value 28.615182
## iter  20 value 16.299008
## iter  30 value 14.442620
## iter  40 value 13.495773
## iter  50 value 13.256909
## iter  60 value 13.107635
## iter  70 value 12.927634
## iter  80 value 12.887414
## iter  90 value 12.886039
## iter 100 value 12.885964
## final  value 12.885964
## stopped after 100 iterations
## - Fold07: size= 6, decay=0.05
## + Fold07: size= 7, decay=0.05
## # weights:  141
## initial  value 126.318927
## iter  10 value 19.062054
## iter  20 value 14.667561
## iter  30 value 13.625398
## iter  40 value 13.308060
## iter  50 value 12.899965
## iter  60 value 12.817403
## iter  70 value 12.813566
## iter  80 value 12.813260
## iter  90 value 12.813171
## iter 100 value 12.813141
## final  value 12.813141
## stopped after 100 iterations
```

```
## - Fold07: size= 7, decay=0.05
## + Fold07: size= 8, decay=0.05
## # weights:  161
## initial  value 115.628058
## iter  10 value 21.282001
## iter  20 value 15.266358
## iter  30 value 13.903248
## iter  40 value 13.531729
## iter  50 value 13.285627
## iter  60 value 13.182260
## iter  70 value 12.871578
## iter  80 value 12.808054
## iter  90 value 12.791934
## iter 100 value 12.744701
## final  value 12.744701
## stopped after 100 iterations
## - Fold07: size= 8, decay=0.05
## + Fold07: size= 9, decay=0.05
## # weights:  181
## initial  value 117.499032
## iter  10 value 22.123934
## iter  20 value 14.764336
## iter  30 value 13.142699
## iter  40 value 12.699074
## iter  50 value 12.664283
## iter  60 value 12.657446
## iter  70 value 12.657142
## iter  80 value 12.657058
## iter  90 value 12.656177
## iter 100 value 12.653298
## final  value 12.653298
## stopped after 100 iterations
## - Fold07: size= 9, decay=0.05
## + Fold07: size=10, decay=0.05
## # weights:  201
## initial  value 116.908407
## iter  10 value 23.277550
## iter  20 value 15.822113
## iter  30 value 14.094286
## iter  40 value 13.489916
## iter  50 value 13.139020
## iter  60 value 13.004759
## iter  70 value 12.702443
## iter  80 value 12.613077
## iter  90 value 12.600622
## iter 100 value 12.593973
## final  value 12.593973
## stopped after 100 iterations
## - Fold07: size=10, decay=0.05
## + Fold07: size=11, decay=0.05
## # weights:  221
## initial  value 123.398315
## iter  10 value 22.171299
## iter  20 value 14.295008
```

```
## iter  30 value 13.451332
## iter  40 value 13.230287
## iter  50 value 12.973062
## iter  60 value 12.739308
## iter  70 value 12.666605
## iter  80 value 12.655719
## iter  90 value 12.652684
## iter 100 value 12.650121
## final  value 12.650121
## stopped after 100 iterations
## - Fold07: size=11, decay=0.05
## + Fold07: size=12, decay=0.05
## # weights:  241
## initial  value 98.730690
## iter  10 value 19.895478
## iter  20 value 14.740453
## iter  30 value 13.573016
## iter  40 value 13.231850
## iter  50 value 13.178732
## iter  60 value 13.150696
## iter  70 value 13.145719
## iter  80 value 13.121965
## iter  90 value 13.048592
## iter 100 value 13.002714
## final  value 13.002714
## stopped after 100 iterations
## - Fold07: size=12, decay=0.05
## + Fold07: size=13, decay=0.05
## # weights:  261
## initial  value 115.621141
## iter  10 value 21.935591
## iter  20 value 14.747274
## iter  30 value 13.547110
## iter  40 value 13.098134
## iter  50 value 12.743457
## iter  60 value 12.620259
## iter  70 value 12.589974
## iter  80 value 12.578042
## iter  90 value 12.575253
## iter 100 value 12.574058
## final  value 12.574058
## stopped after 100 iterations
## - Fold07: size=13, decay=0.05
## + Fold07: size=14, decay=0.05
## # weights:  281
## initial  value 114.168824
## iter  10 value 20.484185
## iter  20 value 14.333991
## iter  30 value 13.143016
## iter  40 value 12.706997
## iter  50 value 12.659942
## iter  60 value 12.647199
## iter  70 value 12.626357
## iter  80 value 12.611068
```

```
## iter  90 value 12.604343
## iter 100 value 12.600857
## final  value 12.600857
## stopped after 100 iterations
## - Fold07: size=14, decay=0.05
## + Fold07: size=15, decay=0.05
## # weights:  301
## initial  value 139.838139
## iter  10 value 18.952376
## iter  20 value 14.548523
## iter  30 value 13.397668
## iter  40 value 12.977826
## iter  50 value 12.714457
## iter  60 value 12.639460
## iter  70 value 12.596351
## iter  80 value 12.573655
## iter  90 value 12.564306
## iter 100 value 12.554340
## final  value 12.554340
## stopped after 100 iterations
## - Fold07: size=15, decay=0.05
## + Fold07: size=16, decay=0.05
## # weights:  321
## initial  value 144.210525
## iter  10 value 26.988516
## iter  20 value 15.858988
## iter  30 value 13.772677
## iter  40 value 13.184509
## iter  50 value 12.818255
## iter  60 value 12.690589
## iter  70 value 12.609929
## iter  80 value 12.572281
## iter  90 value 12.560684
## iter 100 value 12.550638
## final  value 12.550638
## stopped after 100 iterations
## - Fold07: size=16, decay=0.05
## + Fold07: size=17, decay=0.05
## # weights:  341
## initial  value 263.930118
## iter  10 value 33.331477
## iter  20 value 18.810747
## iter  30 value 14.344960
## iter  40 value 13.416960
## iter  50 value 12.945843
## iter  60 value 12.687758
## iter  70 value 12.634861
## iter  80 value 12.597041
## iter  90 value 12.577654
## iter 100 value 12.570431
## final  value 12.570431
## stopped after 100 iterations
## - Fold07: size=17, decay=0.05
## + Fold07: size=18, decay=0.05
```

```
## # weights:  361
## initial  value 136.013749
## iter  10 value 21.717027
## iter  20 value 14.866682
## iter  30 value 13.300545
## iter  40 value 12.789432
## iter  50 value 12.717119
## iter  60 value 12.670236
## iter  70 value 12.624519
## iter  80 value 12.562577
## iter  90 value 12.548671
## iter 100 value 12.534684
## final  value 12.534684
## stopped after 100 iterations
## - Fold07: size=18, decay=0.05
## + Fold07: size=19, decay=0.05
## # weights:  381
## initial  value 155.077414
## iter  10 value 27.270410
## iter  20 value 16.520463
## iter  30 value 13.962364
## iter  40 value 13.032813
## iter  50 value 12.643744
## iter  60 value 12.597081
## iter  70 value 12.588325
## iter  80 value 12.585236
## iter  90 value 12.560369
## iter 100 value 12.554311
## final  value 12.554311
## stopped after 100 iterations
## - Fold07: size=19, decay=0.05
## + Fold07: size=20, decay=0.05
## # weights:  401
## initial  value 152.109475
## iter  10 value 20.435434
## iter  20 value 14.298990
## iter  30 value 12.992443
## iter  40 value 12.731276
## iter  50 value 12.674339
## iter  60 value 12.649030
## iter  70 value 12.591086
## iter  80 value 12.573023
## iter  90 value 12.564463
## iter 100 value 12.560465
## final  value 12.560465
## stopped after 100 iterations
## - Fold07: size=20, decay=0.05
## + Fold07: size= 1, decay=0.10
## # weights:  21
## initial  value 117.368916
## iter  10 value 55.638163
## iter  20 value 31.079432
## iter  30 value 29.650290
## iter  40 value 29.574877
```

```
## iter  40 value 29.574877
## iter  40 value 29.574877
## final  value 29.574877
## converged
## - Fold07: size= 1, decay=0.10
## + Fold07: size= 2, decay=0.10
## # weights:  41
## initial  value 113.286290
## iter  10 value 41.539220
## iter  20 value 27.993355
## iter  30 value 23.524446
## iter  40 value 21.998703
## iter  50 value 21.866898
## iter  60 value 21.855316
## final  value 21.852504
## converged
## - Fold07: size= 2, decay=0.10
## + Fold07: size= 3, decay=0.10
## # weights:  61
## initial  value 121.760810
## iter  10 value 34.695958
## iter  20 value 28.131826
## iter  30 value 23.723050
## iter  40 value 21.927440
## iter  50 value 21.473707
## iter  60 value 21.434424
## iter  70 value 21.333299
## iter  80 value 21.282137
## iter  90 value 21.184154
## iter 100 value 21.152923
## final  value 21.152923
## stopped after 100 iterations
## - Fold07: size= 3, decay=0.10
## + Fold07: size= 4, decay=0.10
## # weights:  81
## initial  value 134.399733
## iter  10 value 36.765846
## iter  20 value 23.479101
## iter  30 value 20.910347
## iter  40 value 20.321364
## iter  50 value 20.263148
## iter  60 value 20.257119
## final  value 20.257091
## converged
## - Fold07: size= 4, decay=0.10
## + Fold07: size= 5, decay=0.10
## # weights:  101
## initial  value 135.649885
## iter  10 value 29.766229
## iter  20 value 20.969000
## iter  30 value 20.654362
## iter  40 value 20.431074
## iter  50 value 20.140274
## iter  60 value 20.026167
```

```
## iter  70 value 20.012656
## final  value 20.012369
## converged
## - Fold07: size= 5, decay=0.10
## + Fold07: size= 6, decay=0.10
## # weights:  121
## initial  value 133.747188
## iter  10 value 29.691392
## iter  20 value 20.913556
## iter  30 value 20.119140
## iter  40 value 19.782979
## iter  50 value 19.662662
## iter  60 value 19.656711
## iter  70 value 19.656559
## final  value 19.656551
## converged
## - Fold07: size= 6, decay=0.10
## + Fold07: size= 7, decay=0.10
## # weights:  141
## initial  value 119.481227
## iter  10 value 27.077958
## iter  20 value 21.290415
## iter  30 value 19.802906
## iter  40 value 19.577026
## iter  50 value 19.564014
## iter  60 value 19.522269
## iter  70 value 19.518083
## iter  80 value 19.518051
## final  value 19.518050
## converged
## - Fold07: size= 7, decay=0.10
## + Fold07: size= 8, decay=0.10
## # weights:  161
## initial  value 127.193893
## iter  10 value 38.769627
## iter  20 value 23.975012
## iter  30 value 20.214648
## iter  40 value 19.624468
## iter  50 value 19.550748
## iter  60 value 19.505883
## iter  70 value 19.474018
## iter  80 value 19.472192
## iter  90 value 19.472086
## iter 100 value 19.471951
## final  value 19.471951
## stopped after 100 iterations
## - Fold07: size= 8, decay=0.10
## + Fold07: size= 9, decay=0.10
## # weights:  181
## initial  value 122.869127
## iter  10 value 26.680277
## iter  20 value 21.687305
## iter  30 value 20.440509
## iter  40 value 20.050621
```

```
## iter  50 value 19.980862
## iter  60 value 19.816330
## iter  70 value 19.767860
## iter  80 value 19.699266
## iter  90 value 19.672419
## iter 100 value 19.670185
## final  value 19.670185
## stopped after 100 iterations
## - Fold07: size= 9, decay=0.10
## + Fold07: size=10, decay=0.10
## # weights:  201
## initial  value 125.913825
## iter  10 value 26.211999
## iter  20 value 20.358852
## iter  30 value 19.680832
## iter  40 value 19.572486
## iter  50 value 19.422760
## iter  60 value 19.153480
## iter  70 value 19.080651
## iter  80 value 19.067961
## iter  90 value 19.058861
## iter 100 value 19.058754
## final  value 19.058754
## stopped after 100 iterations
## - Fold07: size=10, decay=0.10
## + Fold07: size=11, decay=0.10
## # weights:  221
## initial  value 113.612491
## iter  10 value 25.035743
## iter  20 value 20.778425
## iter  30 value 19.704090
## iter  40 value 19.205600
## iter  50 value 19.164136
## iter  60 value 19.160150
## iter  70 value 19.158832
## iter  80 value 19.157879
## iter  90 value 19.154394
## iter 100 value 19.151810
## final  value 19.151810
## stopped after 100 iterations
## - Fold07: size=11, decay=0.10
## + Fold07: size=12, decay=0.10
## # weights:  241
## initial  value 127.517391
## iter  10 value 34.763131
## iter  20 value 22.591551
## iter  30 value 20.139542
## iter  40 value 19.696170
## iter  50 value 19.464781
## iter  60 value 19.429589
## iter  70 value 19.413288
## iter  80 value 19.407106
## iter  90 value 19.405361
## iter 100 value 19.405112
```

```
## final  value 19.405112
## stopped after 100 iterations
## - Fold07: size=12, decay=0.10
## + Fold07: size=13, decay=0.10
## # weights:  261
## initial  value 125.691109
## iter  10 value 29.472091
## iter  20 value 21.528376
## iter  30 value 19.804401
## iter  40 value 19.545427
## iter  50 value 19.437869
## iter  60 value 19.418497
## iter  70 value 19.403828
## iter  80 value 19.392848
## iter  90 value 19.390528
## iter 100 value 19.389639
## final  value 19.389639
## stopped after 100 iterations
## - Fold07: size=13, decay=0.10
## + Fold07: size=14, decay=0.10
## # weights:  281
## initial  value 137.503194
## iter  10 value 33.640383
## iter  20 value 20.800766
## iter  30 value 19.676618
## iter  40 value 19.460392
## iter  50 value 19.410118
## iter  60 value 19.356817
## iter  70 value 19.063824
## iter  80 value 19.031403
## iter  90 value 19.012489
## iter 100 value 18.987307
## final  value 18.987307
## stopped after 100 iterations
## - Fold07: size=14, decay=0.10
## + Fold07: size=15, decay=0.10
## # weights:  301
## initial  value 188.317075
## iter  10 value 37.941663
## iter  20 value 21.293412
## iter  30 value 19.846731
## iter  40 value 19.509868
## iter  50 value 19.424145
## iter  60 value 19.184490
## iter  70 value 19.019595
## iter  80 value 18.981598
## iter  90 value 18.962692
## iter 100 value 18.949049
## final  value 18.949049
## stopped after 100 iterations
## - Fold07: size=15, decay=0.10
## + Fold07: size=16, decay=0.10
## # weights:  321
## initial  value 168.283682
```

```
## iter  10 value 33.883207
## iter  20 value 22.358712
## iter  30 value 20.227401
## iter  40 value 19.744461
## iter  50 value 19.489714
## iter  60 value 19.403870
## iter  70 value 19.375271
## iter  80 value 19.365360
## iter  90 value 19.363578
## iter 100 value 19.363258
## final  value 19.363258
## stopped after 100 iterations
## - Fold07: size=16, decay=0.10
## + Fold07: size=17, decay=0.10
## # weights:  341
## initial  value 136.232809
## iter  10 value 27.021127
## iter  20 value 20.472766
## iter  30 value 19.681292
## iter  40 value 19.206322
## iter  50 value 19.048617
## iter  60 value 19.000914
## iter  70 value 18.956069
## iter  80 value 18.950505
## iter  90 value 18.946135
## iter 100 value 18.943138
## final  value 18.943138
## stopped after 100 iterations
## - Fold07: size=17, decay=0.10
## + Fold07: size=18, decay=0.10
## # weights:  361
## initial  value 185.422487
## iter  10 value 24.327732
## iter  20 value 20.486708
## iter  30 value 19.990278
## iter  40 value 19.627316
## iter  50 value 19.452288
## iter  60 value 19.249657
## iter  70 value 19.005526
## iter  80 value 18.944842
## iter  90 value 18.932356
## iter 100 value 18.927216
## final  value 18.927216
## stopped after 100 iterations
## - Fold07: size=18, decay=0.10
## + Fold07: size=19, decay=0.10
## # weights:  381
## initial  value 161.399396
## iter  10 value 27.552511
## iter  20 value 20.713181
## iter  30 value 20.059865
## iter  40 value 19.749896
## iter  50 value 19.409666
## iter  60 value 19.021675
```

```
## iter  70 value 18.946854
## iter  80 value 18.930925
## iter  90 value 18.922535
## iter 100 value 18.919392
## final  value 18.919392
## stopped after 100 iterations
## - Fold07: size=19, decay=0.10
## + Fold07: size=20, decay=0.10
## # weights:  401
## initial  value 119.046838
## iter  10 value 30.487035
## iter  20 value 21.948104
## iter  30 value 19.574979
## iter  40 value 19.172465
## iter  50 value 19.047805
## iter  60 value 19.007857
## iter  70 value 18.933551
## iter  80 value 18.917349
## iter  90 value 18.913175
## iter 100 value 18.912057
## final  value 18.912057
## stopped after 100 iterations
## - Fold07: size=20, decay=0.10
## + Fold08: size= 1, decay=0.00
## # weights:  21
## initial  value 118.729374
## iter  10 value 31.520017
## iter  20 value 22.745436
## iter  30 value 19.120549
## iter  40 value 17.476661
## iter  50 value 16.328504
## iter  60 value 13.340939
## iter  70 value 13.050176
## final  value 13.049558
## converged
## - Fold08: size= 1, decay=0.00
## + Fold08: size= 2, decay=0.00
## # weights:  41
## initial  value 117.796760
## iter  10 value 23.032319
## iter  20 value 8.144172
## iter  30 value 6.816614
## iter  40 value 6.763106
## iter  50 value 6.740508
## iter  60 value 6.732375
## iter  70 value 6.731705
## iter  80 value 6.731276
## iter  90 value 6.730471
## iter 100 value 6.730305
## final  value 6.730305
## stopped after 100 iterations
## - Fold08: size= 2, decay=0.00
## + Fold08: size= 3, decay=0.00
## # weights:  61
```

```
## initial  value 125.018637
## iter  10 value 17.401380
## iter  20 value 0.818302
## iter  30 value 0.002772
## final  value 0.000071
## converged
## - Fold08: size= 3, decay=0.00
## + Fold08: size= 4, decay=0.00
## # weights:  81
## initial  value 117.851352
## iter  10 value 19.344000
## iter  20 value 4.195923
## iter  30 value 1.804694
## iter  40 value 0.046464
## iter  50 value 0.001493
## final  value 0.000053
## converged
## - Fold08: size= 4, decay=0.00
## + Fold08: size= 5, decay=0.00
## # weights:  101
## initial  value 126.475803
## iter  10 value 21.081631
## iter  20 value 7.668213
## iter  30 value 6.157298
## iter  40 value 5.212023
## iter  50 value 3.305028
## iter  60 value 2.850603
## iter  70 value 2.538734
## iter  80 value 2.517604
## iter  90 value 2.511063
## iter 100 value 2.505451
## final  value 2.505451
## stopped after 100 iterations
## - Fold08: size= 5, decay=0.00
## + Fold08: size= 6, decay=0.00
## # weights:  121
## initial  value 122.268223
## iter  10 value 21.495090
## iter  20 value 1.819908
## iter  30 value 0.084895
## iter  40 value 0.002685
## final  value 0.000051
## converged
## - Fold08: size= 6, decay=0.00
## + Fold08: size= 7, decay=0.00
## # weights:  141
## initial  value 107.140837
## iter  10 value 17.074174
## iter  20 value 1.672559
## iter  30 value 0.023702
## iter  40 value 0.001497
## iter  50 value 0.000322
## iter  60 value 0.000201
## final  value 0.000099
```

```
## converged
## - Fold08: size= 7, decay=0.00
## + Fold08: size= 8, decay=0.00
## # weights:  161
## initial  value 148.046716
## iter  10 value 13.517825
## iter  20 value 0.482869
## iter  30 value 0.010495
## iter  40 value 0.000141
## iter  40 value 0.000085
## iter  40 value 0.000085
## final  value 0.000085
## converged
## - Fold08: size= 8, decay=0.00
## + Fold08: size= 9, decay=0.00
## # weights:  181
## initial  value 140.005197
## iter  10 value 18.712530
## iter  20 value 4.202657
## iter  30 value 0.116302
## iter  40 value 0.010053
## iter  50 value 0.001668
## iter  60 value 0.000245
## final  value 0.000078
## converged
## - Fold08: size= 9, decay=0.00
## + Fold08: size=10, decay=0.00
## # weights:  201
## initial  value 139.201904
## iter  10 value 12.679921
## iter  20 value 0.511469
## iter  30 value 0.008330
## iter  40 value 0.000372
## final  value 0.000058
## converged
## - Fold08: size=10, decay=0.00
## + Fold08: size=11, decay=0.00
## # weights:  221
## initial  value 129.783556
## iter  10 value 17.079714
## iter  20 value 2.761840
## iter  30 value 0.689203
## iter  40 value 0.003569
## final  value 0.000076
## converged
## - Fold08: size=11, decay=0.00
## + Fold08: size=12, decay=0.00
## # weights:  241
## initial  value 127.247406
## iter  10 value 9.746646
## iter  20 value 2.737655
## iter  30 value 1.534296
## iter  40 value 0.095383
## iter  50 value 0.019187
```

```
## iter  60 value 0.010426
## iter  70 value 0.006701
## iter  80 value 0.002977
## iter  90 value 0.001649
## iter 100 value 0.001120
## final  value 0.001120
## stopped after 100 iterations
## - Fold08: size=12, decay=0.00
## + Fold08: size=13, decay=0.00
## # weights:  261
## initial  value 120.237709
## iter  10 value 18.265407
## iter  20 value 5.060777
## iter  30 value 2.187442
## iter  40 value 0.577674
## iter  50 value 0.083965
## iter  60 value 0.028427
## iter  70 value 0.009139
## iter  80 value 0.003228
## iter  90 value 0.001324
## iter 100 value 0.000720
## final  value 0.000720
## stopped after 100 iterations
## - Fold08: size=13, decay=0.00
## + Fold08: size=14, decay=0.00
## # weights:  281
## initial  value 127.194817
## iter  10 value 10.858195
## iter  20 value 0.392016
## iter  30 value 0.002980
## final  value 0.000062
## converged
## - Fold08: size=14, decay=0.00
## + Fold08: size=15, decay=0.00
## # weights:  301
## initial  value 125.457896
## iter  10 value 16.174701
## iter  20 value 0.202729
## iter  30 value 0.003645
## iter  40 value 0.000174
## final  value 0.000092
## converged
## - Fold08: size=15, decay=0.00
## + Fold08: size=16, decay=0.00
## # weights:  321
## initial  value 131.708158
## iter  10 value 14.675695
## iter  20 value 0.807279
## iter  30 value 0.011381
## iter  40 value 0.000950
## iter  50 value 0.000353
## final  value 0.000070
## converged
## - Fold08: size=16, decay=0.00
```

```
## + Fold08: size=17, decay=0.00
## # weights:  341
## initial  value 183.439869
## iter  10 value 18.589812
## iter  20 value 0.475845
## iter  30 value 0.004153
## iter  40 value 0.000402
## iter  50 value 0.000129
## final  value 0.000077
## converged
## - Fold08: size=17, decay=0.00
## + Fold08: size=18, decay=0.00
## # weights:  361
## initial  value 237.107366
## iter  10 value 16.410476
## iter  20 value 0.848630
## iter  30 value 0.012046
## iter  40 value 0.002205
## iter  50 value 0.000500
## final  value 0.000093
## converged
## - Fold08: size=18, decay=0.00
## + Fold08: size=19, decay=0.00
## # weights:  381
## initial  value 122.420782
## iter  10 value 10.162446
## iter  20 value 0.357359
## iter  30 value 0.001985
## final  value 0.000077
## converged
## - Fold08: size=19, decay=0.00
## + Fold08: size=20, decay=0.00
## # weights:  401
## initial  value 138.844851
## iter  10 value 10.454056
## iter  20 value 0.123945
## iter  30 value 0.001526
## iter  40 value 0.000208
## final  value 0.000080
## converged
## - Fold08: size=20, decay=0.00
## + Fold08: size= 1, decay=0.05
## # weights:  21
## initial  value 117.964008
## iter  10 value 34.389386
## iter  20 value 26.187069
## iter  30 value 25.412924
## final  value 25.411917
## converged
## - Fold08: size= 1, decay=0.05
## + Fold08: size= 2, decay=0.05
## # weights:  41
## initial  value 141.466276
## iter  10 value 43.129438
```

```
## iter  20 value 23.143794
## iter  30 value 19.074537
## iter  40 value 17.694603
## iter  50 value 17.622880
## iter  60 value 17.622600
## final  value 17.622594
## converged
## - Fold08: size= 2, decay=0.05
## + Fold08: size= 3, decay=0.05
## # weights:  61
## initial  value 120.404911
## iter  10 value 40.265641
## iter  20 value 19.422809
## iter  30 value 15.663295
## iter  40 value 14.978699
## iter  50 value 14.899276
## iter  60 value 14.892369
## iter  70 value 14.891241
## final  value 14.891220
## converged
## - Fold08: size= 3, decay=0.05
## + Fold08: size= 4, decay=0.05
## # weights:  81
## initial  value 122.808653
## iter  10 value 46.835831
## iter  20 value 21.352985
## iter  30 value 16.477012
## iter  40 value 15.409417
## iter  50 value 14.900579
## iter  60 value 14.701570
## iter  70 value 14.464642
## iter  80 value 14.283321
## iter  90 value 14.250547
## iter 100 value 14.247420
## final  value 14.247420
## stopped after 100 iterations
## - Fold08: size= 4, decay=0.05
## + Fold08: size= 5, decay=0.05
## # weights:  101
## initial  value 116.433511
## iter  10 value 21.746473
## iter  20 value 16.128750
## iter  30 value 15.192061
## iter  40 value 14.809168
## iter  50 value 14.783263
## iter  60 value 14.372111
## iter  70 value 14.217123
## iter  80 value 14.211047
## iter  90 value 14.211009
## iter  90 value 14.211008
## iter  90 value 14.211008
## final  value 14.211008
## converged
## - Fold08: size= 5, decay=0.05
```

```
## + Fold08: size= 6, decay=0.05
## # weights:  121
## initial  value 114.531163
## iter  10 value 27.449003
## iter  20 value 17.060652
## iter  30 value 14.461422
## iter  40 value 13.888738
## iter  50 value 13.778054
## iter  60 value 13.768501
## iter  70 value 13.759987
## iter  80 value 13.738981
## iter  90 value 13.737585
## final  value 13.737575
## converged
## - Fold08: size= 6, decay=0.05
## + Fold08: size= 7, decay=0.05
## # weights:  141
## initial  value 126.647533
## iter  10 value 20.024405
## iter  20 value 15.619424
## iter  30 value 14.297614
## iter  40 value 14.168572
## iter  50 value 14.088054
## iter  60 value 13.941697
## iter  70 value 13.567043
## iter  80 value 13.526885
## iter  90 value 13.518829
## iter 100 value 13.383396
## final  value 13.383396
## stopped after 100 iterations
## - Fold08: size= 7, decay=0.05
## + Fold08: size= 8, decay=0.05
## # weights:  161
## initial  value 145.560706
## iter  10 value 27.741123
## iter  20 value 16.526285
## iter  30 value 14.019302
## iter  40 value 13.479433
## iter  50 value 13.072275
## iter  60 value 12.935693
## iter  70 value 12.900901
## iter  80 value 12.893329
## iter  90 value 12.889248
## iter 100 value 12.888729
## final  value 12.888729
## stopped after 100 iterations
## - Fold08: size= 8, decay=0.05
## + Fold08: size= 9, decay=0.05
## # weights:  181
## initial  value 139.899365
## iter  10 value 21.479335
## iter  20 value 14.263008
## iter  30 value 13.493613
## iter  40 value 13.219789
```

```
## iter  50 value 13.016245
## iter  60 value 13.007143
## iter  70 value 13.006881
## iter  80 value 13.006679
## iter  90 value 13.006638
## iter 100 value 13.006625
## final  value 13.006625
## stopped after 100 iterations
## - Fold08: size= 9, decay=0.05
## + Fold08: size=10, decay=0.05
## # weights:  201
## initial  value 103.246510
## iter  10 value 17.910185
## iter  20 value 14.153859
## iter  30 value 13.535944
## iter  40 value 13.069613
## iter  50 value 12.888560
## iter  60 value 12.832461
## iter  70 value 12.779199
## iter  80 value 12.765091
## iter  90 value 12.761225
## iter 100 value 12.760096
## final  value 12.760096
## stopped after 100 iterations
## - Fold08: size=10, decay=0.05
## + Fold08: size=11, decay=0.05
## # weights:  221
## initial  value 110.950252
## iter  10 value 45.535962
## iter  20 value 20.938396
## iter  30 value 15.188685
## iter  40 value 13.630624
## iter  50 value 13.286165
## iter  60 value 13.029914
## iter  70 value 12.871702
## iter  80 value 12.778078
## iter  90 value 12.746252
## iter 100 value 12.738767
## final  value 12.738767
## stopped after 100 iterations
## - Fold08: size=11, decay=0.05
## + Fold08: size=12, decay=0.05
## # weights:  241
## initial  value 123.468717
## iter  10 value 25.875779
## iter  20 value 14.934850
## iter  30 value 13.337627
## iter  40 value 13.043852
## iter  50 value 12.871564
## iter  60 value 12.742646
## iter  70 value 12.721121
## iter  80 value 12.707107
## iter  90 value 12.704895
## iter 100 value 12.704281
```

```
## final  value 12.704281
## stopped after 100 iterations
## - Fold08: size=12, decay=0.05
## + Fold08: size=13, decay=0.05
## # weights:  261
## initial  value 153.107048
## iter  10 value 29.654495
## iter  20 value 16.781239
## iter  30 value 13.927730
## iter  40 value 13.364653
## iter  50 value 13.257415
## iter  60 value 13.028568
## iter  70 value 12.918009
## iter  80 value 12.809736
## iter  90 value 12.723011
## iter 100 value 12.715027
## final  value 12.715027
## stopped after 100 iterations
## - Fold08: size=13, decay=0.05
## + Fold08: size=14, decay=0.05
## # weights:  281
## initial  value 152.163866
## iter  10 value 21.535285
## iter  20 value 14.436211
## iter  30 value 13.184814
## iter  40 value 12.869685
## iter  50 value 12.742966
## iter  60 value 12.706821
## iter  70 value 12.698002
## iter  80 value 12.695311
## iter  90 value 12.694420
## iter 100 value 12.693931
## final  value 12.693931
## stopped after 100 iterations
## - Fold08: size=14, decay=0.05
## + Fold08: size=15, decay=0.05
## # weights:  301
## initial  value 111.306079
## iter  10 value 22.786224
## iter  20 value 14.399963
## iter  30 value 13.146224
## iter  40 value 12.858148
## iter  50 value 12.749668
## iter  60 value 12.702671
## iter  70 value 12.696238
## iter  80 value 12.690592
## iter  90 value 12.667758
## iter 100 value 12.659637
## final  value 12.659637
## stopped after 100 iterations
## - Fold08: size=15, decay=0.05
## + Fold08: size=16, decay=0.05
## # weights:  321
## initial  value 130.151037
```

```
## iter  10 value 21.615487
## iter  20 value 13.868916
## iter  30 value 13.035930
## iter  40 value 12.845273
## iter  50 value 12.795327
## iter  60 value 12.773900
## iter  70 value 12.707940
## iter  80 value 12.667221
## iter  90 value 12.654093
## iter 100 value 12.648954
## final  value 12.648954
## stopped after 100 iterations
## - Fold08: size=16, decay=0.05
## + Fold08: size=17, decay=0.05
## # weights:  341
## initial  value 131.245953
## iter  10 value 20.671437
## iter  20 value 14.308871
## iter  30 value 13.253386
## iter  40 value 12.953135
## iter  50 value 12.816845
## iter  60 value 12.773732
## iter  70 value 12.762442
## iter  80 value 12.757620
## iter  90 value 12.740640
## iter 100 value 12.728089
## final  value 12.728089
## stopped after 100 iterations
## - Fold08: size=17, decay=0.05
## + Fold08: size=18, decay=0.05
## # weights:  361
## initial  value 150.679601
## iter  10 value 20.209917
## iter  20 value 13.942016
## iter  30 value 12.881115
## iter  40 value 12.698792
## iter  50 value 12.671421
## iter  60 value 12.663481
## iter  70 value 12.655847
## iter  80 value 12.650076
## iter  90 value 12.646183
## iter 100 value 12.641064
## final  value 12.641064
## stopped after 100 iterations
## - Fold08: size=18, decay=0.05
## + Fold08: size=19, decay=0.05
## # weights:  381
## initial  value 182.088497
## iter  10 value 27.655840
## iter  20 value 15.634263
## iter  30 value 13.603470
## iter  40 value 12.992636
## iter  50 value 12.851477
## iter  60 value 12.807497
```

```
## iter  70 value 12.790895
## iter  80 value 12.781816
## iter  90 value 12.769697
## iter 100 value 12.768449
## final  value 12.768449
## stopped after 100 iterations
## - Fold08: size=19, decay=0.05
## + Fold08: size=20, decay=0.05
## # weights:  401
## initial  value 111.779056
## iter  10 value 24.932555
## iter  20 value 15.224746
## iter  30 value 13.812583
## iter  40 value 13.327665
## iter  50 value 12.884154
## iter  60 value 12.749544
## iter  70 value 12.709106
## iter  80 value 12.669828
## iter  90 value 12.631440
## iter 100 value 12.626496
## final  value 12.626496
## stopped after 100 iterations
## - Fold08: size=20, decay=0.05
## + Fold08: size= 1, decay=0.10
## # weights:  21
## initial  value 115.675041
## iter  10 value 60.889955
## iter  20 value 48.854070
## iter  30 value 46.729102
## iter  40 value 33.141372
## iter  50 value 30.539331
## iter  60 value 30.510618
## final  value 30.510605
## converged
## - Fold08: size= 1, decay=0.10
## + Fold08: size= 2, decay=0.10
## # weights:  41
## initial  value 119.664873
## iter  10 value 46.596732
## iter  20 value 30.133590
## iter  30 value 24.611336
## iter  40 value 23.241237
## iter  50 value 23.089701
## iter  60 value 23.087641
## final  value 23.087641
## converged
## - Fold08: size= 2, decay=0.10
## + Fold08: size= 3, decay=0.10
## # weights:  61
## initial  value 127.366409
## iter  10 value 25.218485
## iter  20 value 22.025591
## iter  30 value 21.868951
## iter  40 value 21.429675
```

```
## iter  50 value 21.414859
## final  value 21.414690
## converged
## - Fold08: size= 3, decay=0.10
## + Fold08: size= 4, decay=0.10
## # weights:  81
## initial  value 110.469384
## iter  10 value 29.084309
## iter  20 value 22.910641
## iter  30 value 21.039977
## iter  40 value 20.745103
## iter  50 value 20.743370
## final  value 20.743369
## converged
## - Fold08: size= 4, decay=0.10
## + Fold08: size= 5, decay=0.10
## # weights:  101
## initial  value 120.650276
## iter  10 value 35.323359
## iter  20 value 24.210176
## iter  30 value 21.336609
## iter  40 value 20.708241
## iter  50 value 20.389459
## iter  60 value 20.327291
## iter  70 value 20.315298
## iter  80 value 20.313355
## iter  90 value 20.313325
## iter  90 value 20.313325
## iter  90 value 20.313325
## final  value 20.313325
## converged
## - Fold08: size= 5, decay=0.10
## + Fold08: size= 6, decay=0.10
## # weights:  121
## initial  value 127.437005
## iter  10 value 25.302727
## iter  20 value 21.573138
## iter  30 value 20.695684
## iter  40 value 20.278597
## iter  50 value 20.203281
## iter  60 value 20.070718
## iter  70 value 19.979926
## iter  80 value 19.978340
## iter  90 value 19.978262
## iter  90 value 19.978262
## iter  90 value 19.978262
## final  value 19.978262
## converged
## - Fold08: size= 6, decay=0.10
## + Fold08: size= 7, decay=0.10
## # weights:  141
## initial  value 148.634260
## iter  10 value 30.029599
## iter  20 value 22.007060
```

```
## iter  30 value 20.619870
## iter  40 value 20.120320
## iter  50 value 20.046637
## iter  60 value 20.033119
## iter  70 value 20.029848
## iter  80 value 20.029463
## iter  90 value 20.029415
## final  value 20.029415
## converged
## - Fold08: size= 7, decay=0.10
## + Fold08: size= 8, decay=0.10
## # weights:  161
## initial  value 136.898140
## iter  10 value 30.122527
## iter  20 value 22.049433
## iter  30 value 20.362414
## iter  40 value 20.139181
## iter  50 value 20.079009
## iter  60 value 20.078207
## iter  70 value 20.078146
## final  value 20.078138
## converged
## - Fold08: size= 8, decay=0.10
## + Fold08: size= 9, decay=0.10
## # weights:  181
## initial  value 111.717860
## iter  10 value 27.684301
## iter  20 value 20.706865
## iter  30 value 20.050099
## iter  40 value 19.683190
## iter  50 value 19.562711
## iter  60 value 19.517055
## iter  70 value 19.510577
## iter  80 value 19.510215
## final  value 19.510205
## converged
## - Fold08: size= 9, decay=0.10
## + Fold08: size=10, decay=0.10
## # weights:  201
## initial  value 133.140248
## iter  10 value 26.212570
## iter  20 value 20.700709
## iter  30 value 20.126994
## iter  40 value 19.840072
## iter  50 value 19.570641
## iter  60 value 19.465504
## iter  70 value 19.451451
## iter  80 value 19.446747
## iter  90 value 19.443928
## iter 100 value 19.442990
## final  value 19.442990
## stopped after 100 iterations
## - Fold08: size=10, decay=0.10
## + Fold08: size=11, decay=0.10
```

```
## # weights:  221
## initial  value 120.331128
## iter  10 value 25.622836
## iter  20 value 20.538255
## iter  30 value 20.031649
## iter  40 value 19.626134
## iter  50 value 19.505109
## iter  60 value 19.457321
## iter  70 value 19.437672
## iter  80 value 19.417631
## iter  90 value 19.415102
## iter 100 value 19.409121
## final  value 19.409121
## stopped after 100 iterations
## - Fold08: size=11, decay=0.10
## + Fold08: size=12, decay=0.10
## # weights:  241
## initial  value 135.068573
## iter  10 value 47.677840
## iter  20 value 23.831427
## iter  30 value 20.436749
## iter  40 value 19.726116
## iter  50 value 19.507079
## iter  60 value 19.455396
## iter  70 value 19.430934
## iter  80 value 19.412930
## iter  90 value 19.407771
## iter 100 value 19.406831
## final  value 19.406831
## stopped after 100 iterations
## - Fold08: size=12, decay=0.10
## + Fold08: size=13, decay=0.10
## # weights:  261
## initial  value 114.451184
## iter  10 value 25.645300
## iter  20 value 20.406069
## iter  30 value 19.790929
## iter  40 value 19.492472
## iter  50 value 19.432302
## iter  60 value 19.424128
## iter  70 value 19.419426
## iter  80 value 19.418252
## iter  90 value 19.417579
## iter 100 value 19.416513
## final  value 19.416513
## stopped after 100 iterations
## - Fold08: size=13, decay=0.10
## + Fold08: size=14, decay=0.10
## # weights:  281
## initial  value 162.520596
## iter  10 value 31.793212
## iter  20 value 20.854663
## iter  30 value 20.096889
## iter  40 value 19.594063
```

```
## iter  50 value 19.472554
## iter  60 value 19.428153
## iter  70 value 19.402429
## iter  80 value 19.396407
## iter  90 value 19.393165
## iter 100 value 19.391937
## final  value 19.391937
## stopped after 100 iterations
## - Fold08: size=14, decay=0.10
## + Fold08: size=15, decay=0.10
## # weights:  301
## initial  value 151.685106
## iter  10 value 39.134192
## iter  20 value 22.330267
## iter  30 value 20.284574
## iter  40 value 19.786686
## iter  50 value 19.489924
## iter  60 value 19.449343
## iter  70 value 19.424929
## iter  80 value 19.406549
## iter  90 value 19.397689
## iter 100 value 19.384587
## final  value 19.384587
## stopped after 100 iterations
## - Fold08: size=15, decay=0.10
## + Fold08: size=16, decay=0.10
## # weights:  321
## initial  value 141.664202
## iter  10 value 27.739213
## iter  20 value 21.474842
## iter  30 value 20.068025
## iter  40 value 19.538193
## iter  50 value 19.457403
## iter  60 value 19.386023
## iter  70 value 19.364919
## iter  80 value 19.356396
## iter  90 value 19.354813
## iter 100 value 19.354431
## final  value 19.354431
## stopped after 100 iterations
## - Fold08: size=16, decay=0.10
## + Fold08: size=17, decay=0.10
## # weights:  341
## initial  value 115.182400
## iter  10 value 23.904477
## iter  20 value 19.954547
## iter  30 value 19.628648
## iter  40 value 19.501750
## iter  50 value 19.461895
## iter  60 value 19.431052
## iter  70 value 19.411990
## iter  80 value 19.410347
## iter  90 value 19.410111
## iter 100 value 19.410057
```

```
## final  value 19.410057
## stopped after 100 iterations
## - Fold08: size=17, decay=0.10
## + Fold08: size=18, decay=0.10
## # weights:  361
## initial  value 115.480109
## iter  10 value 24.648628
## iter  20 value 19.709808
## iter  30 value 19.472686
## iter  40 value 19.423734
## iter  50 value 19.409176
## iter  60 value 19.396618
## iter  70 value 19.393544
## iter  80 value 19.392898
## iter  90 value 19.392620
## iter 100 value 19.392441
## final  value 19.392441
## stopped after 100 iterations
## - Fold08: size=18, decay=0.10
## + Fold08: size=19, decay=0.10
## # weights:  381
## initial  value 155.356371
## iter  10 value 25.944020
## iter  20 value 20.016927
## iter  30 value 19.556885
## iter  40 value 19.395219
## iter  50 value 19.355501
## iter  60 value 19.347784
## iter  70 value 19.346239
## iter  80 value 19.345515
## iter  90 value 19.345147
## iter 100 value 19.344714
## final  value 19.344714
## stopped after 100 iterations
## - Fold08: size=19, decay=0.10
## + Fold08: size=20, decay=0.10
## # weights:  401
## initial  value 170.132474
## iter  10 value 41.306813
## iter  20 value 23.724135
## iter  30 value 20.047999
## iter  40 value 19.563913
## iter  50 value 19.473006
## iter  60 value 19.431880
## iter  70 value 19.409824
## iter  80 value 19.398966
## iter  90 value 19.397257
## iter 100 value 19.390954
## final  value 19.390954
## stopped after 100 iterations
## - Fold08: size=20, decay=0.10
## + Fold09: size= 1, decay=0.00
## # weights:  21
## initial  value 119.234252
```

```
## iter  10 value 28.463839
## iter  20 value 17.372349
## iter  30 value 16.283507
## iter  40 value 16.272253
## iter  50 value 16.271855
## final  value 16.271852
## converged
## - Fold09: size= 1, decay=0.00
## + Fold09: size= 2, decay=0.00
## # weights:  41
## initial  value 117.189930
## iter  10 value 27.370543
## iter  20 value 12.760088
## iter  30 value 9.522386
## iter  40 value 8.719078
## iter  50 value 7.784941
## iter  60 value 7.257348
## iter  70 value 6.668596
## iter  80 value 6.198297
## iter  90 value 6.188621
## iter 100 value 6.186553
## final  value 6.186553
## stopped after 100 iterations
## - Fold09: size= 2, decay=0.00
## + Fold09: size= 3, decay=0.00
## # weights:  61
## initial  value 116.476904
## iter  10 value 26.348113
## iter  20 value 8.260055
## iter  30 value 6.058241
## iter  40 value 5.288869
## iter  50 value 4.790471
## iter  60 value 4.780944
## iter  70 value 4.780447
## iter  80 value 4.780358
## final  value 4.780357
## converged
## - Fold09: size= 3, decay=0.00
## + Fold09: size= 4, decay=0.00
## # weights:  81
## initial  value 120.013047
## iter  10 value 35.657839
## iter  20 value 9.903284
## iter  30 value 5.414175
## iter  40 value 0.296129
## iter  50 value 0.002141
## final  value 0.000064
## converged
## - Fold09: size= 4, decay=0.00
## + Fold09: size= 5, decay=0.00
## # weights:  101
## initial  value 122.641429
## iter  10 value 22.153239
## iter  20 value 7.437547
```

```
## iter  30 value 3.705118
## iter  40 value 3.636689
## iter  50 value 3.635670
## iter  60 value 3.635636
## final  value 3.635636
## converged
## - Fold09: size= 5, decay=0.00
## + Fold09: size= 6, decay=0.00
## # weights:  121
## initial  value 113.452530
## iter  10 value 14.623740
## iter  20 value 2.452427
## iter  30 value 1.913726
## iter  40 value 1.910127
## iter  50 value 1.909615
## iter  60 value 1.909550
## final  value 1.909544
## converged
## - Fold09: size= 6, decay=0.00
## + Fold09: size= 7, decay=0.00
## # weights:  141
## initial  value 133.710855
## iter  10 value 12.670401
## iter  20 value 2.840357
## iter  30 value 1.920261
## iter  40 value 1.909882
## iter  50 value 1.909631
## iter  60 value 1.909581
## iter  70 value 1.909544
## final  value 1.909543
## converged
## - Fold09: size= 7, decay=0.00
## + Fold09: size= 8, decay=0.00
## # weights:  161
## initial  value 134.420628
## iter  10 value 26.188049
## iter  20 value 2.230677
## iter  30 value 0.032224
## iter  40 value 0.003015
## iter  50 value 0.000951
## final  value 0.000089
## converged
## - Fold09: size= 8, decay=0.00
## + Fold09: size= 9, decay=0.00
## # weights:  181
## initial  value 106.871411
## iter  10 value 15.194606
## iter  20 value 2.152666
## iter  30 value 0.041307
## iter  40 value 0.000580
## final  value 0.000096
## converged
## - Fold09: size= 9, decay=0.00
## + Fold09: size=10, decay=0.00
```

```
## # weights:  201
## initial  value 122.499303
## iter  10 value 19.776414
## iter  20 value 1.632088
## iter  30 value 0.014240
## final  value 0.000074
## converged
## - Fold09: size=10, decay=0.00
## + Fold09: size=11, decay=0.00
## # weights:  221
## initial  value 169.866479
## iter  10 value 20.238729
## iter  20 value 2.988247
## iter  30 value 0.189343
## iter  40 value 0.039843
## iter  50 value 0.011806
## iter  60 value 0.004724
## iter  70 value 0.002109
## iter  80 value 0.001216
## iter  90 value 0.000845
## iter 100 value 0.000169
## final  value 0.000169
## stopped after 100 iterations
## - Fold09: size=11, decay=0.00
## + Fold09: size=12, decay=0.00
## # weights:  241
## initial  value 161.409512
## iter  10 value 14.526642
## iter  20 value 1.779958
## iter  30 value 0.019366
## iter  40 value 0.001536
## iter  50 value 0.000229
## final  value 0.000081
## converged
## - Fold09: size=12, decay=0.00
## + Fold09: size=13, decay=0.00
## # weights:  261
## initial  value 162.521506
## iter  10 value 13.961245
## iter  20 value 0.595373
## iter  30 value 0.003910
## iter  40 value 0.000201
## final  value 0.000075
## converged
## - Fold09: size=13, decay=0.00
## + Fold09: size=14, decay=0.00
## # weights:  281
## initial  value 135.232310
## iter  10 value 16.233819
## iter  20 value 0.897439
## iter  30 value 0.008630
## final  value 0.000090
## converged
## - Fold09: size=14, decay=0.00
```

```
## + Fold09: size=15, decay=0.00
## # weights:  301
## initial  value 148.515821
## iter  10 value 10.510703
## iter  20 value 0.429341
## iter  30 value 0.009442
## iter  40 value 0.000748
## iter  50 value 0.000238
## final  value 0.000065
## converged
## - Fold09: size=15, decay=0.00
## + Fold09: size=16, decay=0.00
## # weights:  321
## initial  value 144.470242
## iter  10 value 20.670302
## iter  20 value 3.689337
## iter  30 value 0.049191
## iter  40 value 0.006973
## iter  50 value 0.001576
## iter  60 value 0.000318
## final  value 0.000058
## converged
## - Fold09: size=16, decay=0.00
## + Fold09: size=17, decay=0.00
## # weights:  341
## initial  value 138.319219
## iter  10 value 17.554875
## iter  20 value 0.460134
## iter  30 value 0.003632
## iter  40 value 0.000449
## final  value 0.000088
## converged
## - Fold09: size=17, decay=0.00
## + Fold09: size=18, decay=0.00
## # weights:  361
## initial  value 100.385923
## iter  10 value 14.061092
## iter  20 value 0.785372
## iter  30 value 0.080162
## iter  40 value 0.008399
## iter  50 value 0.002625
## iter  60 value 0.000779
## iter  70 value 0.000514
## iter  80 value 0.000289
## final  value 0.000082
## converged
## - Fold09: size=18, decay=0.00
## + Fold09: size=19, decay=0.00
## # weights:  381
## initial  value 111.987391
## iter  10 value 15.337374
## iter  20 value 0.467305
## iter  30 value 0.004708
## iter  40 value 0.000671
```

```
## iter  50 value 0.000222
## final  value 0.000097
## converged
## - Fold09: size=19, decay=0.00
## + Fold09: size=20, decay=0.00
## # weights:  401
## initial  value 123.430904
## iter  10 value 14.678414
## iter  20 value 0.462526
## iter  30 value 0.003152
## final  value 0.000063
## converged
## - Fold09: size=20, decay=0.00
## + Fold09: size= 1, decay=0.05
## # weights:  21
## initial  value 112.476357
## iter  10 value 42.372869
## iter  20 value 28.169691
## iter  30 value 26.909036
## iter  40 value 26.892408
## final  value 26.892405
## converged
## - Fold09: size= 1, decay=0.05
## + Fold09: size= 2, decay=0.05
## # weights:  41
## initial  value 115.743971
## iter  10 value 35.262408
## iter  20 value 25.186378
## iter  30 value 21.474339
## iter  40 value 20.634495
## iter  50 value 20.600124
## iter  60 value 20.599444
## final  value 20.599444
## converged
## - Fold09: size= 2, decay=0.05
## + Fold09: size= 3, decay=0.05
## # weights:  61
## initial  value 126.213777
## iter  10 value 37.039473
## iter  20 value 24.010723
## iter  30 value 20.062488
## iter  40 value 17.868254
## iter  50 value 17.458798
## iter  60 value 17.167301
## iter  70 value 17.119272
## iter  80 value 17.116445
## final  value 17.116439
## converged
## - Fold09: size= 3, decay=0.05
## + Fold09: size= 4, decay=0.05
## # weights:  81
## initial  value 117.407940
## iter  10 value 23.079010
## iter  20 value 17.184987
```

```
## iter  30 value 16.209352
## iter  40 value 15.899711
## iter  50 value 15.499064
## iter  60 value 15.265641
## iter  70 value 15.102059
## iter  80 value 14.974343
## iter  90 value 14.937820
## iter 100 value 14.934161
## final  value 14.934161
## stopped after 100 iterations
## - Fold09: size= 4, decay=0.05
## + Fold09: size= 5, decay=0.05
## # weights:  101
## initial  value 119.802853
## iter  10 value 27.679999
## iter  20 value 19.603611
## iter  30 value 17.279635
## iter  40 value 15.955786
## iter  50 value 15.097095
## iter  60 value 14.807150
## iter  70 value 14.636105
## iter  80 value 14.533529
## iter  90 value 14.532894
## iter 100 value 14.532823
## final  value 14.532823
## stopped after 100 iterations
## - Fold09: size= 5, decay=0.05
## + Fold09: size= 6, decay=0.05
## # weights:  121
## initial  value 117.519082
## iter  10 value 25.388584
## iter  20 value 17.535579
## iter  30 value 15.784227
## iter  40 value 15.058350
## iter  50 value 14.688224
## iter  60 value 14.589493
## iter  70 value 14.462962
## iter  80 value 14.338102
## iter  90 value 14.317191
## iter 100 value 14.290636
## final  value 14.290636
## stopped after 100 iterations
## - Fold09: size= 6, decay=0.05
## + Fold09: size= 7, decay=0.05
## # weights:  141
## initial  value 124.377419
## iter  10 value 21.976418
## iter  20 value 16.472144
## iter  30 value 14.870409
## iter  40 value 14.510613
## iter  50 value 14.315849
## iter  60 value 14.035551
## iter  70 value 13.995110
## iter  80 value 13.968243
```

```
## iter  90 value 13.950536
## iter 100 value 13.949330
## final  value 13.949330
## stopped after 100 iterations
## - Fold09: size= 7, decay=0.05
## + Fold09: size= 8, decay=0.05
## # weights:  161
## initial  value 146.340204
## iter  10 value 65.863033
## iter  20 value 24.070684
## iter  30 value 17.307120
## iter  40 value 15.065812
## iter  50 value 14.438438
## iter  60 value 14.270606
## iter  70 value 14.175465
## iter  80 value 14.126021
## iter  90 value 14.019108
## iter 100 value 13.978129
## final  value 13.978129
## stopped after 100 iterations
## - Fold09: size= 8, decay=0.05
## + Fold09: size= 9, decay=0.05
## # weights:  181
## initial  value 138.193909
## iter  10 value 29.742518
## iter  20 value 17.517630
## iter  30 value 15.288769
## iter  40 value 14.710683
## iter  50 value 14.545848
## iter  60 value 14.373622
## iter  70 value 14.265206
## iter  80 value 13.883317
## iter  90 value 13.804467
## iter 100 value 13.788668
## final  value 13.788668
## stopped after 100 iterations
## - Fold09: size= 9, decay=0.05
## + Fold09: size=10, decay=0.05
## # weights:  201
## initial  value 116.574906
## iter  10 value 24.215667
## iter  20 value 16.390735
## iter  30 value 15.032330
## iter  40 value 14.556833
## iter  50 value 14.410606
## iter  60 value 14.167147
## iter  70 value 14.091534
## iter  80 value 14.071000
## iter  90 value 14.064455
## iter 100 value 14.062288
## final  value 14.062288
## stopped after 100 iterations
## - Fold09: size=10, decay=0.05
## + Fold09: size=11, decay=0.05
```

```
## # weights:  221
## initial  value 142.603684
## iter  10 value 36.291187
## iter  20 value 18.362180
## iter  30 value 14.850005
## iter  40 value 14.225690
## iter  50 value 13.874896
## iter  60 value 13.710283
## iter  70 value 13.639909
## iter  80 value 13.611842
## iter  90 value 13.597974
## iter 100 value 13.588005
## final  value 13.588005
## stopped after 100 iterations
## - Fold09: size=11, decay=0.05
## + Fold09: size=12, decay=0.05
## # weights:  241
## initial  value 117.293974
## iter  10 value 37.868006
## iter  20 value 18.215266
## iter  30 value 15.619786
## iter  40 value 14.499739
## iter  50 value 14.242787
## iter  60 value 14.157535
## iter  70 value 14.016680
## iter  80 value 13.857887
## iter  90 value 13.733864
## iter 100 value 13.670416
## final  value 13.670416
## stopped after 100 iterations
## - Fold09: size=12, decay=0.05
## + Fold09: size=13, decay=0.05
## # weights:  261
## initial  value 143.310732
## iter  10 value 21.419281
## iter  20 value 15.296564
## iter  30 value 13.892537
## iter  40 value 13.645664
## iter  50 value 13.604154
## iter  60 value 13.576004
## iter  70 value 13.564363
## iter  80 value 13.560341
## iter  90 value 13.558721
## iter 100 value 13.555289
## final  value 13.555289
## stopped after 100 iterations
## - Fold09: size=13, decay=0.05
## + Fold09: size=14, decay=0.05
## # weights:  281
## initial  value 128.925766
## iter  10 value 31.764403
## iter  20 value 17.381890
## iter  30 value 14.518281
## iter  40 value 13.793615
```

```
## iter  50 value 13.636712
## iter  60 value 13.593568
## iter  70 value 13.568753
## iter  80 value 13.557447
## iter  90 value 13.547854
## iter 100 value 13.537520
## final  value 13.537520
## stopped after 100 iterations
## - Fold09: size=14, decay=0.05
## + Fold09: size=15, decay=0.05
## # weights:  301
## initial  value 113.980097
## iter  10 value 27.719814
## iter  20 value 16.778356
## iter  30 value 14.457360
## iter  40 value 13.979160
## iter  50 value 13.912966
## iter  60 value 13.873205
## iter  70 value 13.815436
## iter  80 value 13.648653
## iter  90 value 13.553511
## iter 100 value 13.500692
## final  value 13.500692
## stopped after 100 iterations
## - Fold09: size=15, decay=0.05
## + Fold09: size=16, decay=0.05
## # weights:  321
## initial  value 129.519825
## iter  10 value 24.631666
## iter  20 value 15.858178
## iter  30 value 14.474709
## iter  40 value 14.136991
## iter  50 value 13.806663
## iter  60 value 13.707843
## iter  70 value 13.630183
## iter  80 value 13.532112
## iter  90 value 13.503369
## iter 100 value 13.499492
## final  value 13.499492
## stopped after 100 iterations
## - Fold09: size=16, decay=0.05
## + Fold09: size=17, decay=0.05
## # weights:  341
## initial  value 135.662668
## iter  10 value 20.942039
## iter  20 value 15.052398
## iter  30 value 14.116509
## iter  40 value 13.724130
## iter  50 value 13.579056
## iter  60 value 13.539850
## iter  70 value 13.518993
## iter  80 value 13.510488
## iter  90 value 13.501961
## iter 100 value 13.499138
```

```
## final  value 13.499138
## stopped after 100 iterations
## - Fold09: size=17, decay=0.05
## + Fold09: size=18, decay=0.05
## # weights:  361
## initial  value 150.211626
## iter  10 value 22.139290
## iter  20 value 15.048233
## iter  30 value 14.058918
## iter  40 value 13.688945
## iter  50 value 13.560458
## iter  60 value 13.533321
## iter  70 value 13.524835
## iter  80 value 13.519856
## iter  90 value 13.507275
## iter 100 value 13.505177
## final  value 13.505177
## stopped after 100 iterations
## - Fold09: size=18, decay=0.05
## + Fold09: size=19, decay=0.05
## # weights:  381
## initial  value 133.944787
## iter  10 value 22.910550
## iter  20 value 16.093518
## iter  30 value 14.664256
## iter  40 value 14.021394
## iter  50 value 13.658404
## iter  60 value 13.538385
## iter  70 value 13.485554
## iter  80 value 13.468479
## iter  90 value 13.462340
## iter 100 value 13.454031
## final  value 13.454031
## stopped after 100 iterations
## - Fold09: size=19, decay=0.05
## + Fold09: size=20, decay=0.05
## # weights:  401
## initial  value 121.913397
## iter  10 value 20.641301
## iter  20 value 15.368613
## iter  30 value 14.230286
## iter  40 value 13.702632
## iter  50 value 13.567118
## iter  60 value 13.529682
## iter  70 value 13.515518
## iter  80 value 13.492699
## iter  90 value 13.486070
## iter 100 value 13.485182
## final  value 13.485182
## stopped after 100 iterations
## - Fold09: size=20, decay=0.05
## + Fold09: size= 1, decay=0.10
## # weights:  21
## initial  value 135.961686
```

```
## iter  10 value 34.025358
## iter  20 value 31.171261
## iter  30 value 31.112306
## iter  30 value 31.112306
## iter  30 value 31.112306
## final  value 31.112306
## converged
## - Fold09: size= 1, decay=0.10
## + Fold09: size= 2, decay=0.10
## # weights:  41
## initial  value 118.955052
## iter  10 value 47.746438
## iter  20 value 36.372795
## iter  30 value 28.612529
## iter  40 value 28.361472
## iter  50 value 28.360099
## final  value 28.360086
## converged
## - Fold09: size= 2, decay=0.10
## + Fold09: size= 3, decay=0.10
## # weights:  61
## initial  value 124.700512
## iter  10 value 66.729804
## iter  20 value 27.836194
## iter  30 value 25.512187
## iter  40 value 25.376041
## iter  50 value 25.349862
## iter  60 value 25.346893
## iter  70 value 25.346867
## iter  70 value 25.346867
## iter  70 value 25.346867
## final  value 25.346867
## converged
## - Fold09: size= 3, decay=0.10
## + Fold09: size= 4, decay=0.10
## # weights:  81
## initial  value 123.568797
## iter  10 value 27.774717
## iter  20 value 22.770862
## iter  30 value 22.074107
## iter  40 value 21.898385
## iter  50 value 21.871841
## iter  60 value 21.870741
## final  value 21.870738
## converged
## - Fold09: size= 4, decay=0.10
## + Fold09: size= 5, decay=0.10
## # weights:  101
## initial  value 141.926186
## iter  10 value 29.992151
## iter  20 value 24.294509
## iter  30 value 22.623902
## iter  40 value 22.171073
## iter  50 value 22.141714
```

```
## iter  60 value 22.135839
## iter  70 value 22.135576
## iter  80 value 22.135097
## final  value 22.135090
## converged
## - Fold09: size= 5, decay=0.10
## + Fold09: size= 6, decay=0.10
## # weights:  121
## initial  value 138.922733
## iter  10 value 28.354219
## iter  20 value 22.618571
## iter  30 value 21.612836
## iter  40 value 21.534422
## iter  50 value 21.524249
## iter  60 value 21.521845
## iter  70 value 21.521436
## final  value 21.521432
## converged
## - Fold09: size= 6, decay=0.10
## + Fold09: size= 7, decay=0.10
## # weights:  141
## initial  value 133.999319
## iter  10 value 28.434330
## iter  20 value 23.158743
## iter  30 value 21.689747
## iter  40 value 21.352390
## iter  50 value 21.140132
## iter  60 value 20.931618
## iter  70 value 20.806234
## iter  80 value 20.785666
## iter  90 value 20.780816
## iter 100 value 20.780534
## final  value 20.780534
## stopped after 100 iterations
## - Fold09: size= 7, decay=0.10
## + Fold09: size= 8, decay=0.10
## # weights:  161
## initial  value 113.492896
## iter  10 value 26.173822
## iter  20 value 21.852210
## iter  30 value 21.246652
## iter  40 value 21.086998
## iter  50 value 20.883588
## iter  60 value 20.813154
## iter  70 value 20.806469
## iter  80 value 20.803727
## iter  90 value 20.796204
## iter 100 value 20.792690
## final  value 20.792690
## stopped after 100 iterations
## - Fold09: size= 8, decay=0.10
## + Fold09: size= 9, decay=0.10
## # weights:  181
## initial  value 167.924690
```

```
## iter  10 value 27.391257
## iter  20 value 22.088006
## iter  30 value 21.417625
## iter  40 value 21.284438
## iter  50 value 21.180949
## iter  60 value 21.157984
## iter  70 value 21.156473
## iter  80 value 21.156392
## iter  90 value 21.156288
## iter 100 value 21.151189
## final  value 21.151189
## stopped after 100 iterations
## - Fold09: size= 9, decay=0.10
## + Fold09: size=10, decay=0.10
## # weights:  201
## initial  value 155.393190
## iter  10 value 32.653451
## iter  20 value 22.582571
## iter  30 value 21.509547
## iter  40 value 21.215015
## iter  50 value 21.045464
## iter  60 value 20.997196
## iter  70 value 20.970007
## iter  80 value 20.960363
## iter  90 value 20.955412
## iter 100 value 20.948864
## final  value 20.948864
## stopped after 100 iterations
## - Fold09: size=10, decay=0.10
## + Fold09: size=11, decay=0.10
## # weights:  221
## initial  value 147.834979
## iter  10 value 26.570254
## iter  20 value 21.535927
## iter  30 value 20.875325
## iter  40 value 20.716670
## iter  50 value 20.688183
## iter  60 value 20.680579
## iter  70 value 20.676123
## iter  80 value 20.673713
## iter  90 value 20.673040
## iter 100 value 20.673008
## final  value 20.673008
## stopped after 100 iterations
## - Fold09: size=11, decay=0.10
## + Fold09: size=12, decay=0.10
## # weights:  241
## initial  value 162.025607
## iter  10 value 27.812676
## iter  20 value 21.630485
## iter  30 value 21.089781
## iter  40 value 20.873527
## iter  50 value 20.732568
## iter  60 value 20.672506
```

```
## iter  70 value 20.660697
## iter  80 value 20.651896
## iter  90 value 20.650373
## iter 100 value 20.650065
## final  value 20.650065
## stopped after 100 iterations
## - Fold09: size=12, decay=0.10
## + Fold09: size=13, decay=0.10
## # weights:  261
## initial  value 128.096603
## iter  10 value 35.656773
## iter  20 value 22.085852
## iter  30 value 21.278135
## iter  40 value 21.172607
## iter  50 value 21.057932
## iter  60 value 20.967857
## iter  70 value 20.954665
## iter  80 value 20.923319
## iter  90 value 20.919778
## iter 100 value 20.918979
## final  value 20.918979
## stopped after 100 iterations
## - Fold09: size=13, decay=0.10
## + Fold09: size=14, decay=0.10
## # weights:  281
## initial  value 123.887362
## iter  10 value 25.427549
## iter  20 value 21.655539
## iter  30 value 21.030031
## iter  40 value 20.763747
## iter  50 value 20.668334
## iter  60 value 20.636227
## iter  70 value 20.609131
## iter  80 value 20.598469
## iter  90 value 20.595882
## iter 100 value 20.595078
## final  value 20.595078
## stopped after 100 iterations
## - Fold09: size=14, decay=0.10
## + Fold09: size=15, decay=0.10
## # weights:  301
## initial  value 115.755947
## iter  10 value 37.138580
## iter  20 value 22.859002
## iter  30 value 21.441206
## iter  40 value 21.104416
## iter  50 value 20.972003
## iter  60 value 20.898487
## iter  70 value 20.894885
## iter  80 value 20.894323
## iter  90 value 20.893868
## iter 100 value 20.892023
## final  value 20.892023
## stopped after 100 iterations
```

```
## - Fold09: size=15, decay=0.10
## + Fold09: size=16, decay=0.10
## # weights:  321
## initial  value 114.074064
## iter  10 value 27.286902
## iter  20 value 22.149114
## iter  30 value 21.295358
## iter  40 value 21.037777
## iter  50 value 20.979052
## iter  60 value 20.945197
## iter  70 value 20.934272
## iter  80 value 20.933072
## iter  90 value 20.932785
## iter 100 value 20.932628
## final  value 20.932628
## stopped after 100 iterations
## - Fold09: size=16, decay=0.10
## + Fold09: size=17, decay=0.10
## # weights:  341
## initial  value 125.376577
## iter  10 value 25.515035
## iter  20 value 21.699090
## iter  30 value 21.138801
## iter  40 value 21.021029
## iter  50 value 20.733835
## iter  60 value 20.619501
## iter  70 value 20.592481
## iter  80 value 20.584413
## iter  90 value 20.583482
## iter 100 value 20.583340
## final  value 20.583340
## stopped after 100 iterations
## - Fold09: size=17, decay=0.10
## + Fold09: size=18, decay=0.10
## # weights:  361
## initial  value 139.081911
## iter  10 value 26.866282
## iter  20 value 21.338094
## iter  30 value 20.819315
## iter  40 value 20.640095
## iter  50 value 20.588912
## iter  60 value 20.576424
## iter  70 value 20.571748
## iter  80 value 20.570709
## iter  90 value 20.569979
## iter 100 value 20.569662
## final  value 20.569662
## stopped after 100 iterations
## - Fold09: size=18, decay=0.10
## + Fold09: size=19, decay=0.10
## # weights:  381
## initial  value 180.861559
## iter  10 value 31.782386
## iter  20 value 22.089695
```

```
## iter  30 value 21.410397
## iter  40 value 21.171773
## iter  50 value 21.059153
## iter  60 value 21.034704
## iter  70 value 20.969991
## iter  80 value 20.934085
## iter  90 value 20.922898
## iter 100 value 20.920744
## final  value 20.920744
## stopped after 100 iterations
## - Fold09: size=19, decay=0.10
## + Fold09: size=20, decay=0.10
## # weights:  401
## initial  value 138.057109
## iter  10 value 27.389074
## iter  20 value 22.103754
## iter  30 value 21.430024
## iter  40 value 20.962080
## iter  50 value 20.679535
## iter  60 value 20.552593
## iter  70 value 20.534625
## iter  80 value 20.527278
## iter  90 value 20.525597
## iter 100 value 20.525309
## final  value 20.525309
## stopped after 100 iterations
## - Fold09: size=20, decay=0.10
## + Fold10: size= 1, decay=0.00
## # weights:  21
## initial  value 117.031474
## iter  10 value 26.167384
## iter  20 value 16.546762
## iter  30 value 16.398333
## iter  40 value 16.308179
## iter  50 value 16.275235
## iter  60 value 16.274222
## iter  70 value 16.272719
## iter  80 value 16.272193
## final  value 16.272096
## converged
## - Fold10: size= 1, decay=0.00
## + Fold10: size= 2, decay=0.00
## # weights:  41
## initial  value 133.645107
## iter  10 value 18.491842
## iter  20 value 8.567190
## iter  30 value 4.670506
## iter  40 value 4.204242
## iter  50 value 4.187927
## final  value 4.187887
## converged
## - Fold10: size= 2, decay=0.00
## + Fold10: size= 3, decay=0.00
## # weights:  61
```

```
## initial  value 125.632363
## iter  10 value 25.509576
## iter  20 value 14.671110
## iter  30 value 11.285281
## iter  40 value 9.234504
## iter  50 value 7.824381
## iter  60 value 3.028610
## iter  70 value 0.159406
## iter  80 value 0.012691
## iter  90 value 0.006649
## iter 100 value 0.003097
## final  value 0.003097
## stopped after 100 iterations
## - Fold10: size= 3, decay=0.00
## + Fold10: size= 4, decay=0.00
## # weights:  81
## initial  value 122.500085
## iter  10 value 23.634316
## iter  20 value 7.423350
## iter  30 value 0.235872
## iter  40 value 0.005322
## iter  50 value 0.000282
## final  value 0.000071
## converged
## - Fold10: size= 4, decay=0.00
## + Fold10: size= 5, decay=0.00
## # weights:  101
## initial  value 124.248925
## iter  10 value 18.350232
## iter  20 value 1.701822
## iter  30 value 0.010615
## final  value 0.000089
## converged
## - Fold10: size= 5, decay=0.00
## + Fold10: size= 6, decay=0.00
## # weights:  121
## initial  value 114.840229
## iter  10 value 14.849564
## iter  20 value 0.248858
## iter  30 value 0.001876
## final  value 0.000082
## converged
## - Fold10: size= 6, decay=0.00
## + Fold10: size= 7, decay=0.00
## # weights:  141
## initial  value 120.941258
## iter  10 value 23.334593
## iter  20 value 6.008174
## iter  30 value 0.066501
## iter  40 value 0.009638
## iter  50 value 0.000592
## iter  60 value 0.000304
## iter  70 value 0.000119
## iter  70 value 0.000088
```

```
## iter  70 value 0.000087
## final  value 0.000087
## converged
## - Fold10: size= 7, decay=0.00
## + Fold10: size= 8, decay=0.00
## # weights:  161
## initial  value 143.366781
## iter  10 value 14.531883
## iter  20 value 1.405973
## iter  30 value 0.021801
## iter  40 value 0.001180
## final  value 0.000094
## converged
## - Fold10: size= 8, decay=0.00
## + Fold10: size= 9, decay=0.00
## # weights:  181
## initial  value 142.992163
## iter  10 value 17.300130
## iter  20 value 2.400825
## iter  30 value 0.036281
## iter  40 value 0.003792
## iter  50 value 0.000891
## iter  60 value 0.000121
## final  value 0.000098
## converged
## - Fold10: size= 9, decay=0.00
## + Fold10: size=10, decay=0.00
## # weights:  201
## initial  value 125.522515
## iter  10 value 16.589728
## iter  20 value 0.831206
## iter  30 value 0.012436
## final  value 0.000065
## converged
## - Fold10: size=10, decay=0.00
## + Fold10: size=11, decay=0.00
## # weights:  221
## initial  value 122.943811
## iter  10 value 19.051200
## iter  20 value 2.162189
## iter  30 value 0.051245
## iter  40 value 0.007186
## iter  50 value 0.001471
## iter  60 value 0.000513
## iter  70 value 0.000186
## iter  80 value 0.000104
## iter  80 value 0.000099
## iter  80 value 0.000099
## final  value 0.000099
## converged
## - Fold10: size=11, decay=0.00
## + Fold10: size=12, decay=0.00
## # weights:  241
## initial  value 117.878568
```

```
## iter  10 value 16.158372
## iter  20 value 3.590938
## iter  30 value 2.744195
## iter  40 value 2.609955
## iter  50 value 2.258383
## iter  60 value 2.254040
## iter  70 value 2.252487
## iter  80 value 2.250257
## iter  90 value 2.249232
## iter 100 value 2.236565
## final  value 2.236565
## stopped after 100 iterations
## - Fold10: size=12, decay=0.00
## + Fold10: size=13, decay=0.00
## # weights:  261
## initial  value 112.141202
## iter  10 value 14.067557
## iter  20 value 0.532638
## iter  30 value 0.009931
## iter  40 value 0.002043
## final  value 0.000076
## converged
## - Fold10: size=13, decay=0.00
## + Fold10: size=14, decay=0.00
## # weights:  281
## initial  value 130.805388
## iter  10 value 16.587754
## iter  20 value 0.553762
## iter  30 value 0.003770
## iter  40 value 0.000207
## final  value 0.000099
## converged
## - Fold10: size=14, decay=0.00
## + Fold10: size=15, decay=0.00
## # weights:  301
## initial  value 117.801926
## iter  10 value 12.802616
## iter  20 value 0.870903
## iter  30 value 0.004174
## iter  40 value 0.000207
## final  value 0.000090
## converged
## - Fold10: size=15, decay=0.00
## + Fold10: size=16, decay=0.00
## # weights:  321
## initial  value 153.608204
## iter  10 value 14.276480
## iter  20 value 1.018369
## iter  30 value 0.004838
## iter  40 value 0.000333
## final  value 0.000077
## converged
## - Fold10: size=16, decay=0.00
## + Fold10: size=17, decay=0.00
```

```
## # weights:  341
## initial  value 127.523171
## iter  10 value 14.974407
## iter  20 value 0.947428
## iter  30 value 0.004909
## iter  40 value 0.000750
## iter  50 value 0.000138
## final  value 0.000069
## converged
## - Fold10: size=17, decay=0.00
## + Fold10: size=18, decay=0.00
## # weights:  361
## initial  value 131.774612
## iter  10 value 14.782864
## iter  20 value 0.408831
## iter  30 value 0.002070
## final  value 0.000084
## converged
## - Fold10: size=18, decay=0.00
## + Fold10: size=19, decay=0.00
## # weights:  381
## initial  value 163.616469
## iter  10 value 12.399900
## iter  20 value 0.767764
## iter  30 value 0.007763
## iter  40 value 0.000331
## final  value 0.000078
## converged
## - Fold10: size=19, decay=0.00
## + Fold10: size=20, decay=0.00
## # weights:  401
## initial  value 127.089061
## iter  10 value 9.872735
## iter  20 value 0.117562
## iter  30 value 0.006529
## iter  40 value 0.001318
## iter  50 value 0.000303
## iter  60 value 0.000119
## iter  60 value 0.000075
## iter  60 value 0.000075
## final  value 0.000075
## converged
## - Fold10: size=20, decay=0.00
## + Fold10: size= 1, decay=0.05
## # weights:  21
## initial  value 117.050947
## iter  10 value 65.548268
## iter  20 value 30.840674
## iter  30 value 25.388115
## iter  40 value 23.196151
## iter  50 value 23.184582
## iter  60 value 23.184043
## final  value 23.184041
## converged
```

```
## - Fold10: size= 1, decay=0.05
## + Fold10: size= 2, decay=0.05
## # weights:  41
## initial  value 112.691908
## iter  10 value 27.411729
## iter  20 value 23.048111
## iter  30 value 18.955888
## iter  40 value 17.721920
## iter  50 value 17.701305
## final  value 17.701226
## converged
## - Fold10: size= 2, decay=0.05
## + Fold10: size= 3, decay=0.05
## # weights:  61
## initial  value 123.151082
## iter  10 value 30.216281
## iter  20 value 19.030197
## iter  30 value 16.508021
## iter  40 value 15.772146
## iter  50 value 15.711625
## iter  60 value 15.710380
## iter  70 value 15.710292
## iter  80 value 15.710275
## iter  80 value 15.710275
## iter  80 value 15.710275
## final  value 15.710275
## converged
## - Fold10: size= 3, decay=0.05
## + Fold10: size= 4, decay=0.05
## # weights:  81
## initial  value 111.497617
## iter  10 value 28.100801
## iter  20 value 22.796916
## iter  30 value 17.130388
## iter  40 value 15.519023
## iter  50 value 15.308231
## iter  60 value 15.096446
## iter  70 value 14.609643
## iter  80 value 14.599250
## iter  90 value 14.598305
## final  value 14.598293
## converged
## - Fold10: size= 4, decay=0.05
## + Fold10: size= 5, decay=0.05
## # weights:  101
## initial  value 117.065750
## iter  10 value 25.370652
## iter  20 value 15.603625
## iter  30 value 14.729191
## iter  40 value 14.672394
## iter  50 value 14.587508
## iter  60 value 14.544571
## iter  70 value 14.535799
## iter  80 value 14.535000
```

```
## iter  90 value 14.534925
## final  value 14.534923
## converged
## - Fold10: size= 5, decay=0.05
## + Fold10: size= 6, decay=0.05
## # weights:  121
## initial  value 128.464164
## iter  10 value 25.514282
## iter  20 value 18.848813
## iter  30 value 15.958897
## iter  40 value 15.311879
## iter  50 value 15.170985
## iter  60 value 15.058446
## iter  70 value 14.655009
## iter  80 value 14.311930
## iter  90 value 14.258724
## iter 100 value 14.236722
## final  value 14.236722
## stopped after 100 iterations
## - Fold10: size= 6, decay=0.05
## + Fold10: size= 7, decay=0.05
## # weights:  141
## initial  value 121.047600
## iter  10 value 23.216432
## iter  20 value 16.576307
## iter  30 value 15.036448
## iter  40 value 13.775546
## iter  50 value 13.659828
## iter  60 value 13.567819
## iter  70 value 13.526948
## iter  80 value 13.522270
## iter  90 value 13.521002
## final  value 13.520991
## converged
## - Fold10: size= 7, decay=0.05
## + Fold10: size= 8, decay=0.05
## # weights:  161
## initial  value 117.804666
## iter  10 value 22.377295
## iter  20 value 15.346261
## iter  30 value 14.161843
## iter  40 value 13.751714
## iter  50 value 13.643629
## iter  60 value 13.446398
## iter  70 value 13.208466
## iter  80 value 13.132844
## iter  90 value 13.111891
## iter 100 value 13.109557
## final  value 13.109557
## stopped after 100 iterations
## - Fold10: size= 8, decay=0.05
## + Fold10: size= 9, decay=0.05
## # weights:  181
## initial  value 136.896870
```

```
## iter  10 value 24.112974
## iter  20 value 15.749947
## iter  30 value 14.188609
## iter  40 value 13.820910
## iter  50 value 13.597338
## iter  60 value 13.431767
## iter  70 value 13.287010
## iter  80 value 13.237209
## iter  90 value 13.205921
## iter 100 value 13.198027
## final  value 13.198027
## stopped after 100 iterations
## - Fold10: size= 9, decay=0.05
## + Fold10: size=10, decay=0.05
## # weights:  201
## initial  value 121.169252
## iter  10 value 25.721187
## iter  20 value 17.754179
## iter  30 value 14.805827
## iter  40 value 14.251834
## iter  50 value 13.983873
## iter  60 value 13.851059
## iter  70 value 13.762392
## iter  80 value 13.711625
## iter  90 value 13.645071
## iter 100 value 13.617974
## final  value 13.617974
## stopped after 100 iterations
## - Fold10: size=10, decay=0.05
## + Fold10: size=11, decay=0.05
## # weights:  221
## initial  value 132.613065
## iter  10 value 30.546915
## iter  20 value 18.618352
## iter  30 value 14.898744
## iter  40 value 13.902506
## iter  50 value 13.550279
## iter  60 value 13.405489
## iter  70 value 13.293596
## iter  80 value 13.255307
## iter  90 value 13.186507
## iter 100 value 13.159968
## final  value 13.159968
## stopped after 100 iterations
## - Fold10: size=11, decay=0.05
## + Fold10: size=12, decay=0.05
## # weights:  241
## initial  value 147.380316
## iter  10 value 24.269684
## iter  20 value 16.162638
## iter  30 value 14.321563
## iter  40 value 13.678694
## iter  50 value 13.461442
## iter  60 value 13.418045
```

```
## iter  70 value 13.345104
## iter  80 value 13.320271
## iter  90 value 13.277381
## iter 100 value 13.232136
## final  value 13.232136
## stopped after 100 iterations
## - Fold10: size=12, decay=0.05
## + Fold10: size=13, decay=0.05
## # weights:  261
## initial  value 118.267591
## iter  10 value 20.793348
## iter  20 value 14.817880
## iter  30 value 13.466632
## iter  40 value 13.196786
## iter  50 value 13.143859
## iter  60 value 13.132842
## iter  70 value 13.125554
## iter  80 value 13.121997
## iter  90 value 13.120454
## iter 100 value 13.119919
## final  value 13.119919
## stopped after 100 iterations
## - Fold10: size=13, decay=0.05
## + Fold10: size=14, decay=0.05
## # weights:  281
## initial  value 135.637434
## iter  10 value 19.194708
## iter  20 value 14.411455
## iter  30 value 13.271926
## iter  40 value 13.116245
## iter  50 value 13.048433
## iter  60 value 13.034487
## iter  70 value 13.020146
## iter  80 value 13.013088
## iter  90 value 13.010749
## iter 100 value 13.009658
## final  value 13.009658
## stopped after 100 iterations
## - Fold10: size=14, decay=0.05
## + Fold10: size=15, decay=0.05
## # weights:  301
## initial  value 156.178769
## iter  10 value 27.522801
## iter  20 value 16.775223
## iter  30 value 14.373390
## iter  40 value 13.562598
## iter  50 value 13.349533
## iter  60 value 13.166665
## iter  70 value 13.061852
## iter  80 value 13.047664
## iter  90 value 13.030395
## iter 100 value 13.021449
## final  value 13.021449
## stopped after 100 iterations
```

```
## - Fold10: size=15, decay=0.05
## + Fold10: size=16, decay=0.05
## # weights:  321
## initial  value 155.180236
## iter  10 value 40.529895
## iter  20 value 19.436652
## iter  30 value 15.388909
## iter  40 value 14.109151
## iter  50 value 13.686886
## iter  60 value 13.442937
## iter  70 value 13.299025
## iter  80 value 13.224339
## iter  90 value 13.191370
## iter 100 value 13.168815
## final  value 13.168815
## stopped after 100 iterations
## - Fold10: size=16, decay=0.05
## + Fold10: size=17, decay=0.05
## # weights:  341
## initial  value 124.114582
## iter  10 value 19.683643
## iter  20 value 14.535230
## iter  30 value 13.323684
## iter  40 value 13.093812
## iter  50 value 12.995099
## iter  60 value 12.983371
## iter  70 value 12.980077
## iter  80 value 12.977086
## iter  90 value 12.974527
## iter 100 value 12.973510
## final  value 12.973510
## stopped after 100 iterations
## - Fold10: size=17, decay=0.05
## + Fold10: size=18, decay=0.05
## # weights:  361
## initial  value 133.481125
## iter  10 value 21.013885
## iter  20 value 14.470712
## iter  30 value 13.548868
## iter  40 value 13.407067
## iter  50 value 13.376419
## iter  60 value 13.261559
## iter  70 value 13.176723
## iter  80 value 13.166626
## iter  90 value 13.162414
## iter 100 value 13.160073
## final  value 13.160073
## stopped after 100 iterations
## - Fold10: size=18, decay=0.05
## + Fold10: size=19, decay=0.05
## # weights:  381
## initial  value 117.002837
## iter  10 value 22.004206
## iter  20 value 15.329701
```

```
## iter  30 value 13.742317
## iter  40 value 13.364757
## iter  50 value 13.200064
## iter  60 value 13.033768
## iter  70 value 13.006544
## iter  80 value 13.000121
## iter  90 value 12.996437
## iter 100 value 12.995478
## final  value 12.995478
## stopped after 100 iterations
## - Fold10: size=19, decay=0.05
## + Fold10: size=20, decay=0.05
## # weights:  401
## initial  value 151.562259
## iter  10 value 21.409303
## iter  20 value 14.655810
## iter  30 value 13.467860
## iter  40 value 13.192657
## iter  50 value 13.108126
## iter  60 value 13.046963
## iter  70 value 13.034817
## iter  80 value 13.023365
## iter  90 value 13.011091
## iter 100 value 13.010077
## final  value 13.010077
## stopped after 100 iterations
## - Fold10: size=20, decay=0.05
## + Fold10: size= 1, decay=0.10
## # weights:  21
## initial  value 118.789774
## iter  10 value 32.330350
## iter  20 value 30.696893
## iter  30 value 30.623352
## iter  30 value 30.623352
## iter  30 value 30.623352
## final  value 30.623352
## converged
## - Fold10: size= 1, decay=0.10
## + Fold10: size= 2, decay=0.10
## # weights:  41
## initial  value 115.530010
## iter  10 value 30.586521
## iter  20 value 24.836249
## iter  30 value 22.665998
## iter  40 value 22.547217
## final  value 22.547185
## converged
## - Fold10: size= 2, decay=0.10
## + Fold10: size= 3, decay=0.10
## # weights:  61
## initial  value 138.455220
## iter  10 value 26.885079
## iter  20 value 22.228580
## iter  30 value 21.608579
```

```
## iter  40 value 21.302095
## final  value 21.302000
## converged
## - Fold10: size= 3, decay=0.10
## + Fold10: size= 4, decay=0.10
## # weights:  81
## initial  value 127.123877
## iter  10 value 33.416587
## iter  20 value 22.733109
## iter  30 value 21.698348
## iter  40 value 21.150338
## iter  50 value 21.009309
## iter  60 value 20.869215
## iter  70 value 20.857867
## iter  80 value 20.857677
## final  value 20.857677
## converged
## - Fold10: size= 4, decay=0.10
## + Fold10: size= 5, decay=0.10
## # weights:  101
## initial  value 136.396940
## iter  10 value 26.988404
## iter  20 value 22.366214
## iter  30 value 21.477351
## iter  40 value 20.932489
## iter  50 value 20.736279
## iter  60 value 20.544031
## iter  70 value 20.523244
## iter  80 value 20.520754
## iter  90 value 20.520700
## final  value 20.520700
## converged
## - Fold10: size= 5, decay=0.10
## + Fold10: size= 6, decay=0.10
## # weights:  121
## initial  value 130.539030
## iter  10 value 36.388413
## iter  20 value 22.733485
## iter  30 value 21.102562
## iter  40 value 20.665890
## iter  50 value 20.380978
## iter  60 value 20.212956
## iter  70 value 20.160684
## iter  80 value 20.131201
## iter  90 value 20.130159
## final  value 20.130107
## converged
## - Fold10: size= 6, decay=0.10
## + Fold10: size= 7, decay=0.10
## # weights:  141
## initial  value 136.810833
## iter  10 value 25.297228
## iter  20 value 21.238553
## iter  30 value 20.547690
```

```
## iter  40 value 20.400267
## iter  50 value 20.226834
## iter  60 value 20.205106
## iter  70 value 20.204961
## final  value 20.204956
## converged
## - Fold10: size= 7, decay=0.10
## + Fold10: size= 8, decay=0.10
## # weights:  161
## initial  value 138.501106
## iter  10 value 31.761089
## iter  20 value 23.230875
## iter  30 value 20.896447
## iter  40 value 20.403382
## iter  50 value 20.205078
## iter  60 value 20.142522
## iter  70 value 20.128708
## iter  80 value 20.127736
## iter  90 value 20.127436
## iter 100 value 20.127312
## final  value 20.127312
## stopped after 100 iterations
## - Fold10: size= 8, decay=0.10
## + Fold10: size= 9, decay=0.10
## # weights:  181
## initial  value 128.112723
## iter  10 value 25.298539
## iter  20 value 21.215691
## iter  30 value 20.606477
## iter  40 value 20.392994
## iter  50 value 20.302300
## iter  60 value 20.296459
## iter  70 value 20.292891
## iter  80 value 20.251208
## iter  90 value 20.221395
## iter 100 value 19.936268
## final  value 19.936268
## stopped after 100 iterations
## - Fold10: size= 9, decay=0.10
## + Fold10: size=10, decay=0.10
## # weights:  201
## initial  value 139.406486
## iter  10 value 25.808345
## iter  20 value 21.360755
## iter  30 value 20.586964
## iter  40 value 20.362350
## iter  50 value 20.153279
## iter  60 value 20.075724
## iter  70 value 20.062524
## iter  80 value 20.059785
## iter  90 value 20.050476
## iter 100 value 20.045313
## final  value 20.045313
## stopped after 100 iterations
```

```
## - Fold10: size=10, decay=0.10
## + Fold10: size=11, decay=0.10
## # weights:  221
## initial  value 133.351954
## iter  10 value 28.067377
## iter  20 value 21.296887
## iter  30 value 20.775347
## iter  40 value 20.449658
## iter  50 value 20.181477
## iter  60 value 20.125268
## iter  70 value 20.089930
## iter  80 value 20.083986
## iter  90 value 20.080968
## iter 100 value 20.075387
## final  value 20.075387
## stopped after 100 iterations
## - Fold10: size=11, decay=0.10
## + Fold10: size=12, decay=0.10
## # weights:  241
## initial  value 114.815279
## iter  10 value 24.748534
## iter  20 value 21.063108
## iter  30 value 20.465842
## iter  40 value 20.208937
## iter  50 value 20.076305
## iter  60 value 20.038586
## iter  70 value 20.018706
## iter  80 value 20.015462
## iter  90 value 20.008692
## iter 100 value 20.006657
## final  value 20.006657
## stopped after 100 iterations
## - Fold10: size=12, decay=0.10
## + Fold10: size=13, decay=0.10
## # weights:  261
## initial  value 125.065458
## iter  10 value 25.089177
## iter  20 value 20.751431
## iter  30 value 20.366164
## iter  40 value 20.175513
## iter  50 value 20.062859
## iter  60 value 20.000609
## iter  70 value 19.904190
## iter  80 value 19.825876
## iter  90 value 19.815793
## iter 100 value 19.814195
## final  value 19.814195
## stopped after 100 iterations
## - Fold10: size=13, decay=0.10
## + Fold10: size=14, decay=0.10
## # weights:  281
## initial  value 146.069510
## iter  10 value 29.507453
## iter  20 value 20.774799
```

```
## iter  30 value 19.983989
## iter  40 value 19.874888
## iter  50 value 19.843319
## iter  60 value 19.804873
## iter  70 value 19.800689
## iter  80 value 19.798381
## iter  90 value 19.797370
## iter 100 value 19.797070
## final  value 19.797070
## stopped after 100 iterations
## - Fold10: size=14, decay=0.10
## + Fold10: size=15, decay=0.10
## # weights:  301
## initial  value 134.597470
## iter  10 value 26.503232
## iter  20 value 20.661538
## iter  30 value 20.216408
## iter  40 value 20.123261
## iter  50 value 20.077921
## iter  60 value 20.003652
## iter  70 value 19.984833
## iter  80 value 19.982487
## iter  90 value 19.981806
## iter 100 value 19.981642
## final  value 19.981642
## stopped after 100 iterations
## - Fold10: size=15, decay=0.10
## + Fold10: size=16, decay=0.10
## # weights:  321
## initial  value 125.270358
## iter  10 value 25.416857
## iter  20 value 21.113959
## iter  30 value 20.368891
## iter  40 value 20.117755
## iter  50 value 19.944439
## iter  60 value 19.874686
## iter  70 value 19.850667
## iter  80 value 19.844961
## iter  90 value 19.838929
## iter 100 value 19.834914
## final  value 19.834914
## stopped after 100 iterations
## - Fold10: size=16, decay=0.10
## + Fold10: size=17, decay=0.10
## # weights:  341
## initial  value 140.517930
## iter  10 value 28.632460
## iter  20 value 21.035979
## iter  30 value 20.281129
## iter  40 value 20.141133
## iter  50 value 20.092630
## iter  60 value 20.081195
## iter  70 value 20.055662
## iter  80 value 20.050237
```

```
## iter  90 value 20.048785
## iter 100 value 20.048178
## final  value 20.048178
## stopped after 100 iterations
## - Fold10: size=17, decay=0.10
## + Fold10: size=18, decay=0.10
## # weights:  361
## initial  value 131.460361
## iter  10 value 33.094729
## iter  20 value 21.909944
## iter  30 value 20.466005
## iter  40 value 20.210924
## iter  50 value 20.082120
## iter  60 value 20.006231
## iter  70 value 19.965613
## iter  80 value 19.825920
## iter  90 value 19.805163
## iter 100 value 19.795993
## final  value 19.795993
## stopped after 100 iterations
## - Fold10: size=18, decay=0.10
## + Fold10: size=19, decay=0.10
## # weights:  381
## initial  value 157.809268
## iter  10 value 27.499558
## iter  20 value 21.337361
## iter  30 value 20.483182
## iter  40 value 20.269102
## iter  50 value 20.054094
## iter  60 value 19.991009
## iter  70 value 19.975119
## iter  80 value 19.959446
## iter  90 value 19.954073
## iter 100 value 19.952560
## final  value 19.952560
## stopped after 100 iterations
## - Fold10: size=19, decay=0.10
## + Fold10: size=20, decay=0.10
## # weights:  401
## initial  value 125.313515
## iter  10 value 26.732455
## iter  20 value 20.904951
## iter  30 value 20.248567
## iter  40 value 19.987162
## iter  50 value 19.867540
## iter  60 value 19.808325
## iter  70 value 19.792953
## iter  80 value 19.786925
## iter  90 value 19.785079
## iter 100 value 19.784026
## final  value 19.784026
## stopped after 100 iterations
## - Fold10: size=20, decay=0.10
## Aggregating results
```

```
## Selecting tuning parameters
## Fitting size = 1, decay = 0.1 on full training set
## # weights:  21
## initial  value 133.344460
## iter  10 value 34.417603
## iter  20 value 32.537529
## final  value 32.470993
## converged
```

```
modeloPM
```

```
## Neural Network
##
## 185 samples
##  18 predictor
##   2 classes: 'Perdido', 'Ganado'
##
## Pre-processing: centered (18), scaled (18)
## 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   0.9195322  0.8388850
##    1    0.05   0.9081579  0.8161662
##    1    0.10   0.9303801  0.8606106
##    2    0.00   0.8917836  0.7832115
##    2    0.05   0.9195322  0.8388850
##    2    0.10   0.9142690  0.8283884
##    3    0.00   0.8703801  0.7407305
##    3    0.05   0.9195322  0.8390023
##    3    0.10   0.9195322  0.8390023
##    4    0.00   0.9189766  0.8377739
##    4    0.05   0.9139766  0.8277726
##    4    0.10   0.9084211  0.8167801
##    5    0.00   0.8812281  0.7622203
##    5    0.05   0.9028655  0.8056690
##    5    0.10   0.9139766  0.8278912
##    6    0.00   0.9131579  0.8260502
##    6    0.05   0.9084211  0.8167801
##    6    0.10   0.9028655  0.8056690
##    7    0.00   0.8584503  0.7171306
##    7    0.05   0.9084211  0.8167801
##    7    0.10   0.9031579  0.8061662
##    8    0.00   0.8923684  0.7845565
##    8    0.05   0.8973099  0.7945578
##    8    0.10   0.9139766  0.8278912
##    9    0.00   0.8861988  0.7722170
##    9    0.05   0.9139766  0.8278912
##    9    0.10   0.9195322  0.8390023
##   10    0.00   0.8809649  0.7616038
##   10    0.05   0.9087135  0.8172773
##   10    0.10   0.9028655  0.8056690
##   11    0.00   0.8757018  0.7508687
```

```
##   11    0.05   0.9195322  0.8390023
##   11    0.10   0.9139766  0.8278912
##   12    0.00   0.8867544  0.7733294
##   12    0.05   0.9139766  0.8278912
##   12    0.10   0.9139766  0.8278912
##   13    0.00   0.8698538  0.7391450
##   13    0.05   0.9028655  0.8056690
##   13    0.10   0.9195322  0.8390023
##   14    0.00   0.8695322  0.7392311
##   14    0.05   0.9139766  0.8278912
##   14    0.10   0.9139766  0.8278912
##   15    0.00   0.8645614  0.7290016
##   15    0.05   0.9084211  0.8167801
##   15    0.10   0.9195322  0.8390023
##   16    0.00   0.8759649  0.7519537
##   16    0.05   0.9139766  0.8278912
##   16    0.10   0.9139766  0.8278912
##   17    0.00   0.8698246  0.7397264
##   17    0.05   0.9084211  0.8167801
##   17    0.10   0.8973099  0.7945578
##   18    0.00   0.8920468  0.7839453
##   18    0.05   0.9084211  0.8167801
##   18    0.10   0.9195322  0.8390023
##   19    0.00   0.8595906  0.7187567
##   19    0.05   0.8917544  0.7834467
##   19    0.10   0.9139766  0.8278912
##   20    0.00   0.8926023  0.7849371
##   20    0.05   0.9084211  0.8167801
##   20    0.10   0.9084211  0.8167801
##
## Accuracy was used to select the optimal model using the largest value.
## The final values used for the model were size = 1 and decay = 0.1.
```

```
modeloPM$finalModel
```

```
## a 18-1-1 network with 21 weights
## inputs: `\`Sets jugados\`` Tot BP G `\`G-P\`` `\`Saque-Tot\`` `\`Saque-Pts\`` `\`Saque-Err\`` `\`Rec
## output(s): .outcome
## options were - entropy fitting  decay=0.1
```

```
summary(modeloPM)
```

```
## a 18-1-1 network with 21 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
##    0.11    0.13    1.04    2.08   -0.18    1.51    1.04   -0.31    0.63   -3.74
## i10->h1 i11->h1 i12->h1 i13->h1 i14->h1 i15->h1 i16->h1 i17->h1 i18->h1
##   -0.42   -1.10   -0.11    0.29   -0.59   -1.20    1.53    0.05   -0.51
##  b->o h1->o
## -3.93  7.13
```

```r
# modeloPM$results
```

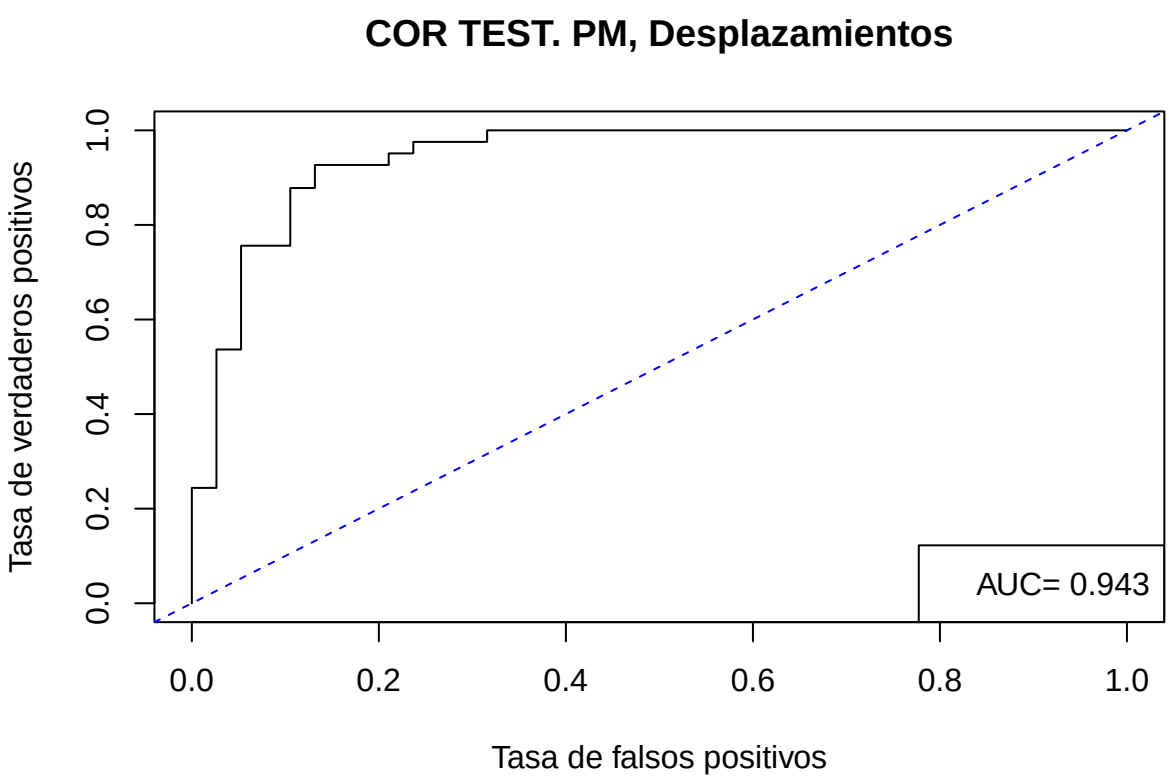
```r
preditestPM= predict(modeloPM,dattest[,-20])
confutestPM=table(RealPM_test=dattest[,20]$`Ganado/Perdido`,
                  PredPM_test=preditestPM)
confutestPM
```

```
##            PredPM_test
## RealPM_test Perdido Ganado
##     Perdido      38      3
##     Ganado        5     33
```

```r
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
```

```r
probabiPM= predict(modeloPM,newdata = dat[inditest,2:19] ,
                   type="prob")[,1] #Prob. ganar
prediobjPM=prediction(probabiPM,dat[inditest,20])
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","Perceptron Multicapas")
Resul
```

```
##                         Acierto       AUC Perdido Ganado
## Gauss                     79.75 0.8809371   78.05  81.58
## Kernel(Poisson)           87.34 0.9050064   80.49  94.74
## LDA                       88.61 0.9454429   87.80  89.47
## Perceptron Multicapas     89.87 0.9428755   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.

```r
#Definir opciones para train
ctrl <- trainControl(method="cv",classProbs=TRUE,
                     summaryFunction = twoClassSummary)

modeloSVM <- train(`Ganado/Perdido` ~ ., data = datent[,2:20],
                   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.
```

```r
modeloSVM
```

```
## Support Vector Machines with Radial Basis Function Kernel
##
## 185 samples
##  18 predictor
##   2 classes: 'Perdido', 'Ganado'
##
## Pre-processing: re-scaling to [0, 1] (18)
## Resampling: Cross-Validated (10 fold)
## Summary of sample sizes: 165, 167, 165, 167, 167, 167, ...
## Resampling results across tuning parameters:
##
##   C     sigma  ROC        Sens        Spec
##    0.1  0.025  0.9593333  0.80777778  0.9355556
##    0.1  0.035  0.9614568  0.80777778  0.9355556
##    0.1  0.500  0.9266296  0.08888889  0.9600000
##    1.0  0.025  0.9703457  0.84777778  0.8688889
##    1.0  0.035  0.9703457  0.85888889  0.8688889
##    1.0  0.500  0.9242716  0.90444444  0.8044444
##    5.0  0.025  0.9688642  0.88111111  0.8788889
##    5.0  0.035  0.9662716  0.88111111  0.8788889
##    5.0  0.500  0.9195679  0.88222222  0.8044444
##   10.0  0.025  0.9588642  0.87111111  0.9011111
##   10.0  0.035  0.9437531  0.87000000  0.8788889
##   10.0  0.500  0.9195679  0.90222222  0.8155556
##   50.0  0.025  0.9458765  0.87000000  0.8677778
##   50.0  0.035  0.9460988  0.85000000  0.8566667
##   50.0  0.500  0.9195679  0.89333333  0.8266667
##
## ROC was used to select the optimal model using the largest value.
## The final values used for the model were sigma = 0.035 and C = 1.
```

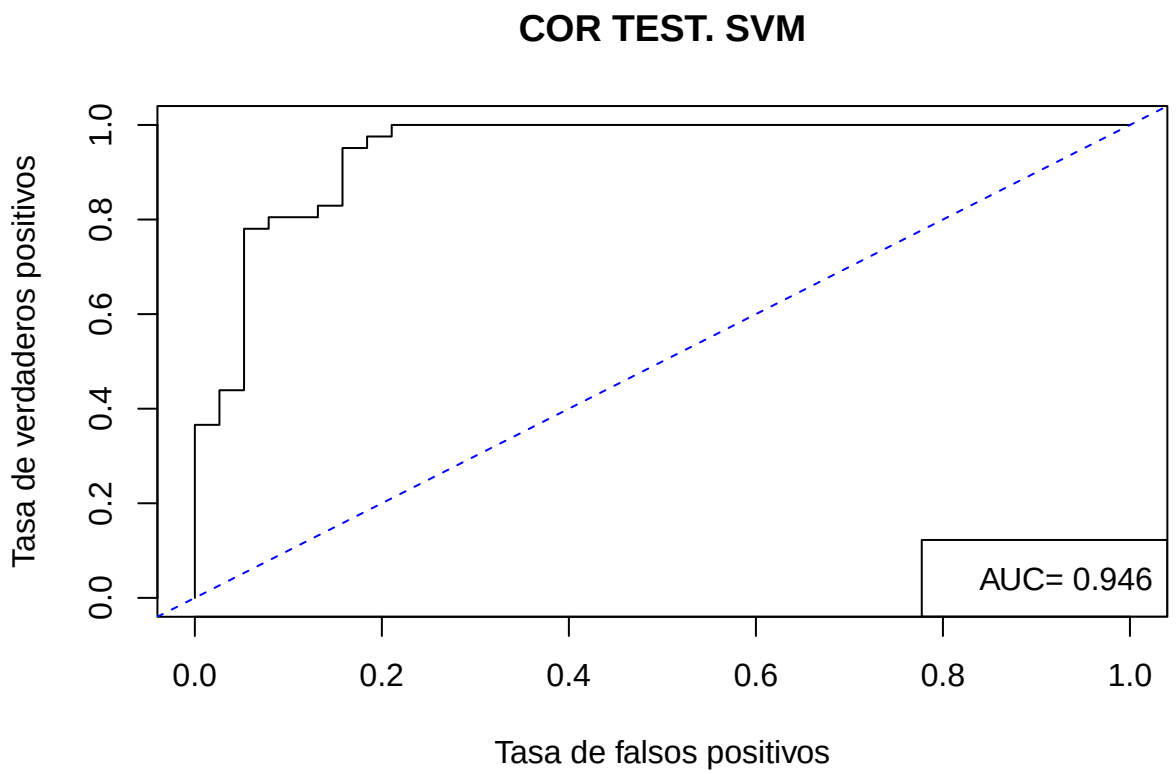
```r
predictestSVM<- predict(modeloSVM,dattest[,2:19])
confutestSVM<-table(Real=dattest$`Ganado/Perdido`,
                    Pred=predictestSVM)
confutestSVM
```

```
##          Pred
## Real      Perdido Ganado
##   Perdido      40      1
##   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
##   89.87   97.56   81.58
```

```
probabiSVM= predict(modeloSVM,newdata = dat[inditest,2:19] ,
                    type="prob")[,1] #Prob. ganar
prediobjSVM=prediction(probabiSVM,dat[inditest,20])
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","Perceptron Multicapas", "Vectores soporte")
Resul
```

```
##                         Acierto       AUC Perdido Ganado
## Gauss                     79.75 0.8809371   78.05  81.58
## Kernel(Poisson)           87.34 0.9050064   80.49  94.74
## LDA                       88.61 0.9454429   87.80  89.47
## Perceptron Multicapas     89.87 0.9428755   92.68  86.84
## Vectores soporte          89.87 0.9460847   97.56  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[, 2:19],
                           datent$`Ganado/Perdido`)
dim(upSampled_train)
```

```
## [1] 186  19
```

```
table(upSampled_train$Class)
```

```
##
## Perdido  Ganado
##      93      93
```

```
names(upSampled_train)[19]= "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
##  18 predictor
```

```
##   2 classes: 'Perdido', 'Ganado'
##
## Pre-processing: re-scaling to [0, 1] (18)
## Resampling: Cross-Validated (5 fold)
## Summary of sample sizes: 149, 149, 148, 149, 149
## Resampling results across tuning parameters:
##
##   C     sigma  ROC        Sens       Spec
##    0.1  0.025  0.9577716  0.8076023  0.9672515
##    0.1  0.035  0.9605725  0.8187135  0.9672515
##    0.1  0.050  0.9650970  0.8397661  0.9362573
##    1.0  0.025  0.9762696  0.8397661  0.9362573
##    1.0  0.035  0.9727916  0.8502924  0.9146199
##    1.0  0.050  0.9704217  0.8502924  0.9146199
##    5.0  0.025  0.9663897  0.8502924  0.9146199
##    5.0  0.035  0.9611265  0.8608187  0.9146199
##    5.0  0.050  0.9559557  0.8713450  0.9035088
##   10.0  0.025  0.9607264  0.8713450  0.9029240
##   10.0  0.035  0.9514004  0.8713450  0.9035088
##   10.0  0.050  0.9417051  0.8713450  0.8818713
##   50.0  0.025  0.9325639  0.8608187  0.8602339
##   50.0  0.035  0.9284087  0.8391813  0.8502924
##   50.0  0.050  0.9126500  0.8175439  0.8608187
##
## Sens was used to select the optimal model using the largest value.
## The final values used for the model were sigma = 0.05 and C = 5.
```

Evaluamos el modelo

```
predictestUp = predict(SVMUp, dattest[,2:19])

confutestSVM_up<-table(Real=dattest$`Ganado/Perdido`,
                Pred=predictestUp)
confutestSVM_up
```

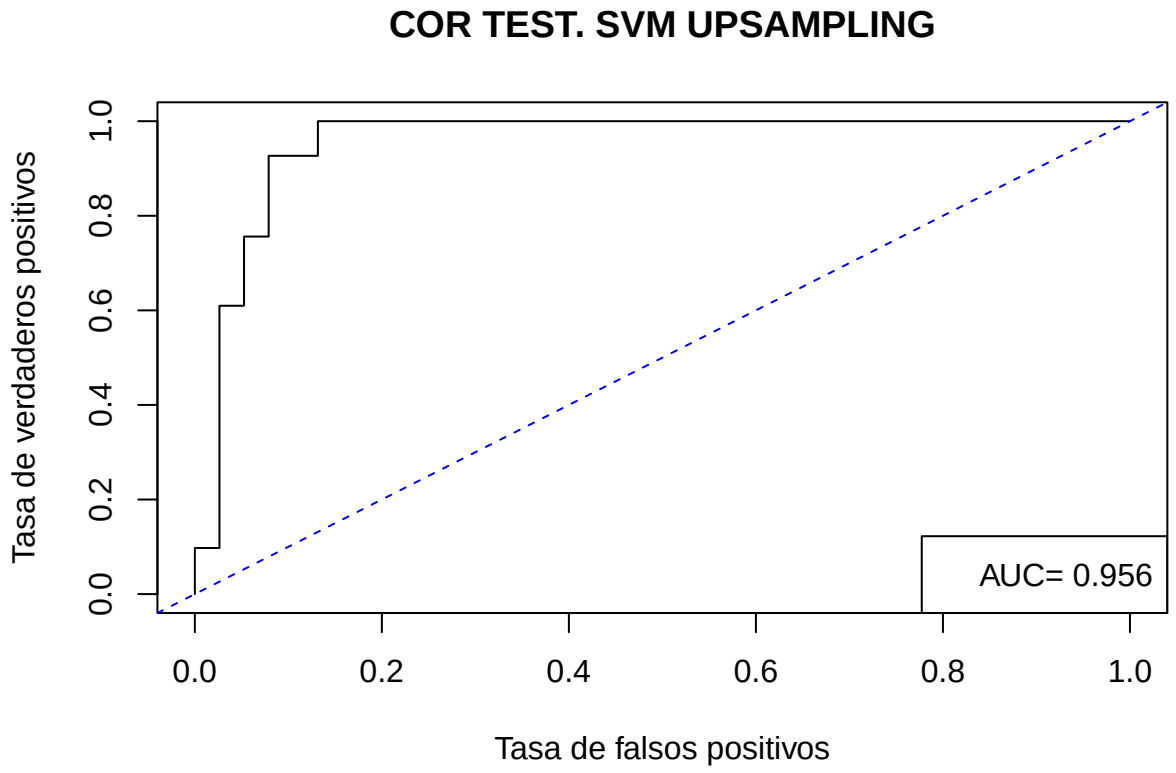
```
##          Pred
## Real      Perdido Ganado
##   Perdido      41      0
##   Ganado        6     32
```

```
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  100.00   84.21
```

```
probabiSVM_up= predict(SVMUp,newdata = dat[inditest,2:19] ,
                  type="prob")[,1] #Prob. ganar
prediobjSVM_up = prediction(probabiSVM_up,dat[inditest,20])
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","Perceptron Multicapas", "Vectores soporte","Vectores
Resul
```

```
##                                Acierto       AUC Perdido Ganado
## Gauss                            79.75 0.8809371   78.05  81.58
## Kernel(Poisson)                  87.34 0.9050064   80.49  94.74
## LDA                              88.61 0.9454429   87.80  89.47
## Perceptron Multicapas            89.87 0.9428755   92.68  86.84
## Vectores soporte                 89.87 0.9460847   97.56  81.58
## Vectores soporte con Upsampling  92.41 0.9557125  100.00  84.21
```

Árbol de clasificación

```
library(rpart)
library(graphics)
modeloAB <- rpart(`Ganado/Perdido` ~ .,
```

```
                    data=datent[,2:20],method="class")
modeloAB
```

```
## n= 185
##
## node), split, n, loss, yval, (yprob)
##       * denotes terminal node
##
##  1) root 185 92 Ganado (0.49729730 0.50270270)
##    2) G-P< 25.5 72  3 Perdido (0.95833333 0.04166667) *
##    3) G-P>=25.5 113 23 Ganado (0.20353982 0.79646018)
##      6) Recep-Tot>=92.5 23  8 Perdido (0.65217391 0.34782609)
##       12) Tot< 81.5 15  1 Perdido (0.93333333 0.06666667) *
##       13) Tot>=81.5 8  1 Ganado (0.12500000 0.87500000) *
##      7) Recep-Tot< 92.5 90  8 Ganado (0.08888889 0.91111111)
##       14) Recep-Tot>=80.5 24  7 Ganado (0.29166667 0.70833333)
##         28) Ataque-Tot< 145.5 9  3 Perdido (0.66666667 0.33333333) *
##         29) Ataque-Tot>=145.5 15  1 Ganado (0.06666667 0.93333333) *
##       15) Recep-Tot< 80.5 66  1 Ganado (0.01515152 0.98484848) *
```

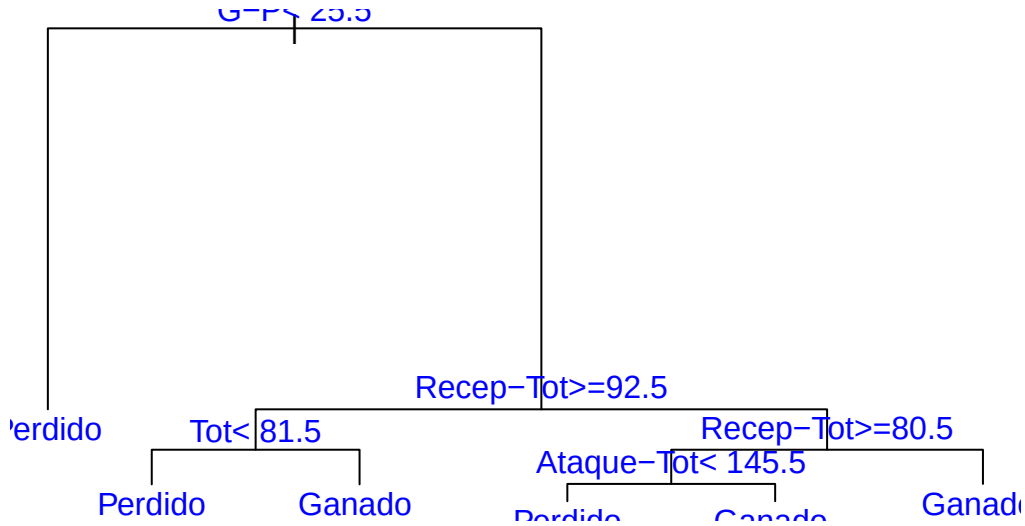
```
# summary(modeloAB)
modeloAB$parms #probabilidades a priori, costes
```

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

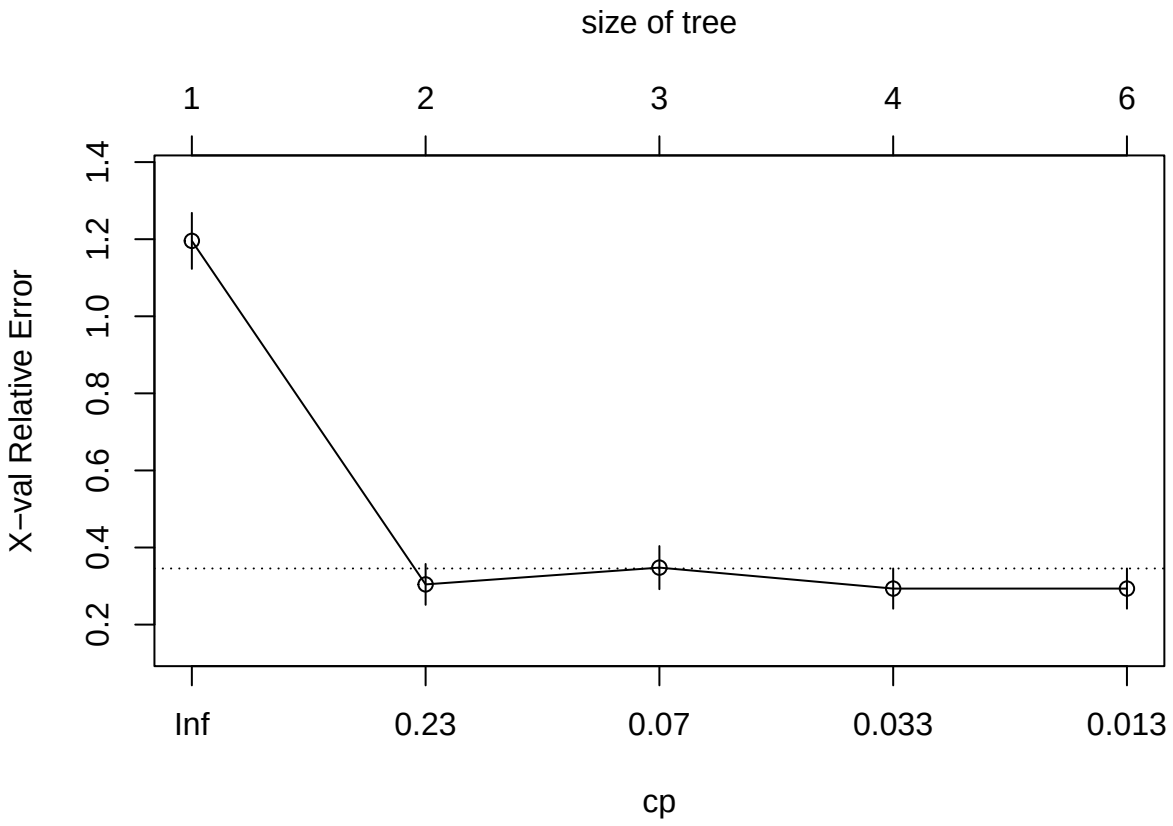
```
modeloAB$variable.importance
```

```
##          G-P          Tot    Saque-Tot           BP   Ataque-Exc    Saque-Pts
##    57.023716    41.869122    40.432132    38.903733    31.722678    19.487272
##    Recep-Tot   Ataque-Tot            G    Recep-Exc    Recep-Neg Sets jugados
##    14.316022    10.056609     9.180962     2.021671     1.800000     1.345707
```

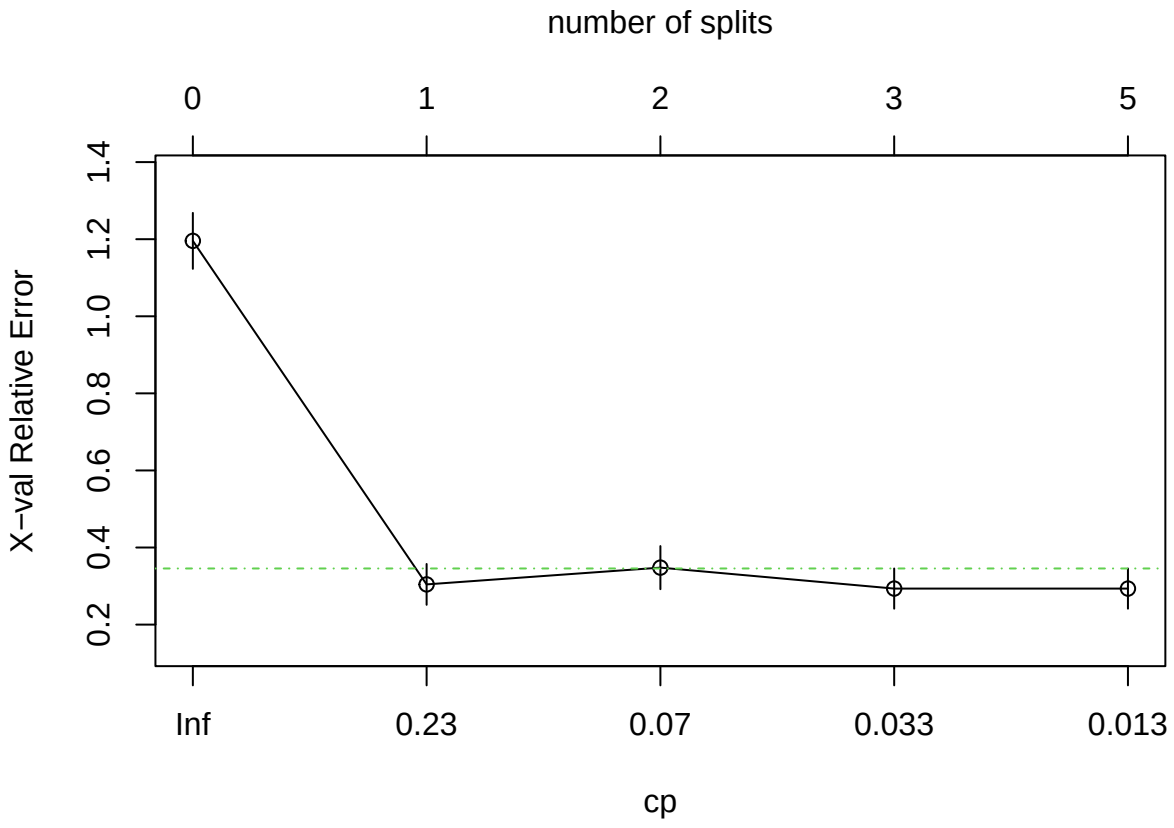
```
plot(modeloAB,main="Arbol de clasificacion",compress=TRUE)
text(modeloAB,col="blue")
```




```
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[, 2:20],
##     method = "class")
##
## Variables actually used in tree construction:
## [1] Ataque-Tot G-P        Recep-Tot  Tot
##
## Root node error: 92/185 = 0.4973
##
## n= 185
##
##         CP nsplit rel error  xerror     xstd
## 1 0.717391      0   1.00000 1.19565 0.072586
## 2 0.076087      1   0.28261 0.30435 0.052985
## 3 0.065217      2   0.20652 0.34783 0.055917
## 4 0.016304      3   0.14130 0.29348 0.052196
## 5 0.010000      5   0.10870 0.29348 0.052196
```

```
predictestAB <- predict(modeloAB,type="class", dattest[,2:19])
confutestAB<-table(dattest$`Ganado/Perdido`,predictestAB,deparse.level = 2)
confutestAB
```

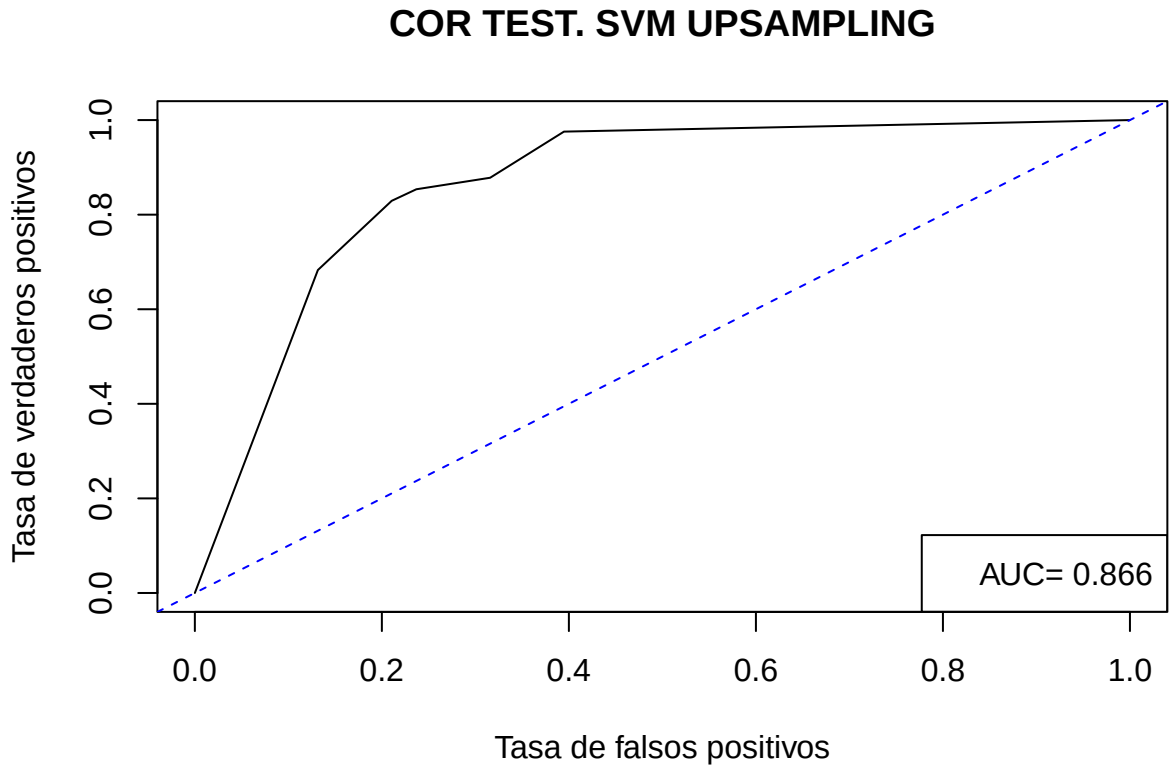
```
##                         predictestAB
```

```
## dattest$‘Ganado/Perdido‘ Perdido Ganado
##                  Perdido      35      6
##                  Ganado        9     29
```

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

```
##         Perdido  Ganado
##   81.01   85.37   76.32
```

```
probabiAB= predict(modeloAB,newdata = dat[inditest,2:19] ,
                   type="prob")[,1]
prediobjAB = prediction(probabiAB,dat[inditest,20])
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","Perceptron Multicapas", "Vectores soporte","Vectores
Resul
```

```
##                                 Acierto       AUC Perdido Ganado
## Gauss                             79.75 0.8809371   78.05  81.58
## Kernel(Poisson)                   87.34 0.9050064   80.49  94.74
## LDA                               88.61 0.9454429   87.80  89.47
## Perceptron Multicapas             89.87 0.9428755   92.68  86.84
## Vectores soporte                  89.87 0.9460847   97.56  81.58
## Vectores soporte con Upsampling   92.41 0.9557125  100.00  84.21
## Arbol de clasificacion            81.01 0.8661746   85.37  76.32
```

```
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 multica
```