4198 HW6 Min Yang

### 1.2

adult <- read.csv(file = "~/desktop/Clem3Training.csv",  
stringsAsFactors=TRUE)  
# We will work with first 10000 variables.  
adult <- adult[1:10000,]  
# Create indicator variables  
  
adult$sex2=c(rep(0, length(adult$income)))  
  
adult$race\_white=adult$race\_black=adult$race\_as.pac.is=  
adult$race\_am.in.esk=adult$wc\_gov=adult$wc\_self=  
adult$wc\_priv=adult$ms\_marr=adult$ms\_div=adult$ms\_sep=  
adult$ms\_wid=adult$income\_g50K=adult$sex2  
  
for (i in 1:length(adult$income)) {  
if(adult$income[i]==">50K.")  
adult$income\_g50K[i]<-1  
if(adult$sex[i] == "Male")  
adult$sex2[i] <- 1  
if(adult$race[i] == "White") adult$race\_white[i] <- 1  
if(adult$race[i] == "Amer-Indian-Eskimo") adult$race\_am.in.esk[i] <- 1  
if(adult$race[i] == "Asian-Pac-Islander") adult$race\_as.pac.is[i] <- 1  
if(adult$race[i] == "Black") adult$race\_black[i] <- 1  
if(adult$workclass[i] == "Gov") adult$wc\_gov[i] <- 1  
if(adult$workclass[i] == "Self") adult$wc\_self[i] <- 1  
if(adult$workclass[i] == "Private" ) adult$wc\_priv[i] <- 1  
if(adult$marital.status[i] == "Married") adult$ms\_marr[i] <- 1  
if(adult$marital.status[i] == "Divorced" ) adult$ms\_div[i] <- 1  
if(adult$marital.status[i] == "Separated" ) adult$ms\_sep[i] <- 1  
if(adult$marital.status[i] == "Widowed" ) adult$ms\_wid[i] <- 1  
}  
  
  
# Minimax transform the continuous variables  
adult$age\_mm <- (adult$age - min(adult$age))/(max(adult$age)-min(adult$age))  
adult$edu.num\_mm <- (adult$education.num - min(adult$education.num))/  
(max(adult$education.num)-min(adult$education.num))  
adult$capital.gain\_mm <- (adult$capital.gain - min(adult$capital.gain))/  
(max(adult$capital.gain)- min(adult$capital.gain))  
adult$capital.loss\_mm <- (adult$capital.loss - min(adult$capital.loss))/  
(max(adult$capital.loss)- min(adult$capital.loss))  
adult$hours.p.w\_mm <- (adult$hours.per.week - min(adult$hours.per.week))/  
(max(adult$hours.per.week)-min(adult$hours.per.week))  
newdat <- as.data.frame(adult[,-c(1:15,31:32)]) # Get rid of the variables we no longer need

ncol(newdat)

## [1] 16

nrow(newdat)

## [1] 10000

### 3.

library("nnet") # Requires package nnet  
  
newdat\_training<-newdat[1:8000,]  
newdat\_testing<-newdat[8001:10000,]

library('nnet')

### 4.

logistic.model <- glm(income\_g50K~., data = newdat\_training,   
family = binomial())  
prediction <- predict(logistic.model, newdat\_testing, type = "response")

## Warning in predict.lm(object, newdata, se.fit, scale = 1, type =  
## ifelse(type == : prediction from a rank-deficient fit may be misleading

table(newdat\_testing$income\_g50K , prediction >= 0.5)

##   
## FALSE TRUE  
## 0 1422 111  
## 1 269 198

misscls.test<-sum((prediction-newdat\_testing$income\_g50K)^2)/  
length(newdat\_testing$income\_g50K)  
misscls.test

## [1] 0.1322452

### 5.

I choose seed=550，test with node= 5,6,7,8. maxit=500,600,700,750,800,1000. decay=0,0.1,0.2,0.4,0.6

set.seed(550)  
myNewFrame <- data.frame(node = integer(0),maxit = integer(0), decay = integer(0) ,misscls.train = integer(0), misscls.test = integer(0))  
  
for (i in c(5, 6, 7, 8)) {  
 for (m in c(500, 600, 700, 750,800, 1000)) {  
 for (d in c(0, 0.1, 0.2, 0.4,0.6)) {  
 net.dat <- nnet(income\_g50K~., data = newdat\_training, size = i, decay = d, maxit = m)  
 #table(round(net.dat$fitted.values, 1))  
 estimated\_income\_g50K=as.numeric(net.dat$fitted.values>0.5)  
 T = table(estimated\_income\_g50K,newdat\_training$income\_g50K)  
 misscls.train<-sum((estimated\_income\_g50K-newdat\_training$income\_g50K)^2)/length(newdat\_training$income\_g50K)  
 misscls.train  
 presdicted.testing<-as.numeric(predict(net.dat,newdat\_testing )>0.5)  
 Ttest = table(presdicted.testing, newdat\_testing$income\_g50K)  
 misscls.test<-sum((presdicted.testing-newdat\_testing$income\_g50K)^2)/length(newdat\_testing$income\_g50K)  
 misscls.test  
   
 df <- data.frame(i, m, d, misscls.train, misscls.test)  
 names(df)<-c("node", "maxit", "decay", "misscls.train", "misscls.test")  
 myNewFrame <- rbind(myNewFrame, df)  
 }  
 }   
}

## # weights: 86  
## initial value 1570.985821   
## iter 10 value 1128.966854  
## iter 20 value 1075.236477  
## iter 30 value 1036.263703  
## iter 40 value 1017.445697  
## iter 50 value 1011.247374  
## iter 60 value 1007.513829  
## iter 70 value 1005.754667  
## iter 80 value 1004.152869  
## iter 90 value 1002.628859  
## iter 100 value 1001.773434  
## iter 110 value 1001.174574  
## iter 120 value 1000.940498  
## iter 130 value 1000.828191  
## iter 140 value 1000.424164  
## iter 150 value 1000.198494  
## iter 160 value 1000.105932  
## iter 170 value 999.666560  
## iter 180 value 999.359574  
## iter 190 value 999.243362  
## iter 200 value 999.151140  
## iter 210 value 999.105353  
## iter 220 value 999.086177  
## iter 230 value 999.036517  
## iter 240 value 998.912435  
## iter 250 value 998.816505  
## iter 260 value 998.676580  
## iter 270 value 998.431839  
## iter 280 value 998.265626  
## iter 290 value 998.192607  
## iter 300 value 998.040126  
## iter 310 value 997.945465  
## iter 320 value 997.848985  
## iter 330 value 997.635252  
## iter 340 value 996.736755  
## iter 350 value 996.462769  
## iter 360 value 996.439759  
## iter 370 value 996.406150  
## iter 380 value 996.354559  
## iter 390 value 996.333855  
## iter 400 value 996.326598  
## iter 410 value 996.321246  
## iter 420 value 996.317804  
## iter 430 value 996.309575  
## iter 440 value 996.278265  
## iter 450 value 996.227601  
## iter 460 value 996.222723  
## iter 470 value 996.221434  
## final value 996.221177   
## converged  
## # weights: 86  
## initial value 2667.133059   
## iter 10 value 1895.391976  
## iter 20 value 1224.893709  
## iter 30 value 1092.367989  
## iter 40 value 1056.261486  
## iter 50 value 1045.374361  
## iter 60 value 1036.390089  
## iter 70 value 1035.348762  
## iter 80 value 1034.084507  
## iter 90 value 1032.929646  
## iter 100 value 1032.273371  
## iter 110 value 1031.814473  
## iter 120 value 1031.376934  
## iter 130 value 1031.323051  
## iter 140 value 1031.211831  
## iter 150 value 1031.023110  
## iter 160 value 1030.989567  
## iter 170 value 1030.916484  
## iter 180 value 1030.836037  
## iter 190 value 1030.742926  
## iter 200 value 1030.517028  
## iter 210 value 1030.403790  
## iter 220 value 1030.391846  
## final value 1030.391649   
## converged  
## # weights: 86  
## initial value 1812.199418   
## iter 10 value 1436.815060  
## iter 20 value 1164.203702  
## iter 30 value 1087.195056  
## iter 40 value 1063.774070  
## iter 50 value 1061.020106  
## iter 60 value 1058.928072  
## iter 70 value 1057.081241  
## iter 80 value 1056.078994  
## iter 90 value 1055.727235  
## iter 100 value 1055.443116  
## iter 110 value 1055.251611  
## iter 120 value 1055.072330  
## iter 130 value 1055.044472  
## iter 140 value 1055.036579  
## iter 150 value 1054.964556  
## iter 160 value 1054.934717  
## iter 170 value 1054.931473  
## iter 180 value 1054.922796  
## iter 190 value 1054.894066  
## iter 200 value 1054.807611  
## iter 210 value 1054.697648  
## iter 220 value 1054.652258  
## iter 230 value 1054.641498  
## iter 240 value 1054.625341  
## iter 250 value 1054.615519  
## iter 260 value 1054.613246  
## iter 260 value 1054.613241  
## iter 260 value 1054.613240  
## final value 1054.613240   
## converged  
## # weights: 86  
## initial value 1921.891835   
## iter 10 value 1430.866098  
## iter 20 value 1192.249302  
## iter 30 value 1124.819520  
## iter 40 value 1113.271448  
## iter 50 value 1097.059126  
## iter 60 value 1090.796343  
## iter 70 value 1089.604409  
## iter 80 value 1089.109657  
## iter 90 value 1088.863608  
## iter 100 value 1088.782865  
## iter 110 value 1088.775048  
## iter 120 value 1088.771293  
## final value 1088.770723   
## converged  
## # weights: 86  
## initial value 2192.299200   
## iter 10 value 1333.608820  
## iter 20 value 1163.736552  
## iter 30 value 1131.231433  
## iter 40 value 1120.241836  
## iter 50 value 1119.497872  
## iter 60 value 1118.616624  
## iter 70 value 1117.277076  
## iter 80 value 1116.141679  
## iter 90 value 1115.423172  
## iter 100 value 1114.878931  
## iter 110 value 1114.662049  
## iter 120 value 1114.446903  
## iter 130 value 1114.282662  
## iter 140 value 1114.211904  
## iter 150 value 1114.162461  
## iter 160 value 1114.088746  
## iter 170 value 1114.045930  
## iter 180 value 1114.005343  
## iter 190 value 1113.978714  
## iter 200 value 1113.947117  
## iter 210 value 1113.936540  
## iter 220 value 1113.935353  
## final value 1113.935222   
## converged  
## # weights: 86  
## initial value 2610.741543   
## final value 1912.000000   
## converged  
## # weights: 86  
## initial value 1475.683822   
## iter 10 value 1201.426276  
## iter 20 value 1095.038464  
## iter 30 value 1060.631554  
## iter 40 value 1040.513024  
## iter 50 value 1037.782201  
## iter 60 value 1036.980167  
## iter 70 value 1036.194624  
## iter 80 value 1034.506273  
## iter 90 value 1033.532577  
## iter 100 value 1033.113376  
## iter 110 value 1032.239397  
## iter 120 value 1031.481830  
## iter 130 value 1030.923150  
## iter 140 value 1030.663108  
## iter 150 value 1030.617449  
## iter 160 value 1030.592596  
## iter 170 value 1030.587355  
## iter 180 value 1030.579507  
## iter 190 value 1030.576864  
## iter 200 value 1030.574287  
## iter 210 value 1030.569218  
## iter 220 value 1030.567550  
## iter 230 value 1030.567190  
## final value 1030.567173   
## converged  
## # weights: 86  
## initial value 2110.158588   
## iter 10 value 1490.086947  
## iter 20 value 1254.183701  
## iter 30 value 1137.510653  
## iter 40 value 1076.714789  
## iter 50 value 1060.982718  
## iter 60 value 1057.187119  
## iter 70 value 1056.076013  
## iter 80 value 1055.440612  
## iter 90 value 1055.288475  
## iter 100 value 1055.230134  
## iter 110 value 1055.186774  
## iter 120 value 1055.163480  
## iter 130 value 1055.131618  
## iter 140 value 1055.075448  
## iter 150 value 1055.032606  
## iter 160 value 1054.979954  
## iter 170 value 1054.967244  
## iter 180 value 1054.889348  
## iter 190 value 1054.813860  
## iter 200 value 1054.659928  
## iter 210 value 1054.633658  
## iter 220 value 1054.617348  
## final value 1054.613236   
## converged  
## # weights: 86  
## initial value 1546.098505   
## iter 10 value 1163.606554  
## iter 20 value 1117.556789  
## iter 30 value 1099.173749  
## iter 40 value 1094.238116  
## iter 50 value 1093.407138  
## iter 60 value 1092.965187  
## iter 70 value 1092.786768  
## iter 80 value 1092.237646  
## iter 90 value 1091.360084  
## iter 100 value 1090.909285  
## iter 110 value 1090.399413  
## iter 120 value 1090.163250  
## iter 130 value 1090.099121  
## iter 140 value 1090.014846  
## iter 150 value 1089.885554  
## iter 160 value 1089.774046  
## iter 170 value 1089.720853  
## iter 180 value 1089.706371  
## iter 190 value 1089.697247  
## iter 200 value 1089.694584  
## final value 1089.694554   
## converged  
## # weights: 86  
## initial value 3384.782081   
## iter 10 value 1266.525748  
## iter 20 value 1156.819879  
## iter 30 value 1134.168708  
## iter 40 value 1128.640779  
## iter 50 value 1120.470533  
## iter 60 value 1117.314174  
## iter 70 value 1115.916251  
## iter 80 value 1114.861223  
## iter 90 value 1114.628092  
## iter 100 value 1114.432430  
## iter 110 value 1114.284547  
## iter 120 value 1114.023366  
## iter 130 value 1113.901118  
## iter 140 value 1113.857338  
## iter 150 value 1113.830211  
## iter 160 value 1113.820330  
## iter 170 value 1113.816605  
## final value 1113.815387   
## converged  
## # weights: 86  
## initial value 2587.331631   
## final value 1912.000000   
## converged  
## # weights: 86  
## initial value 2799.758752   
## iter 10 value 1343.790837  
## iter 20 value 1104.432709  
## iter 30 value 1069.572338  
## iter 40 value 1052.505241  
## iter 50 value 1045.632629  
## iter 60 value 1041.154872  
## iter 70 value 1038.336304  
## iter 80 value 1038.171655  
## iter 90 value 1038.137390  
## iter 100 value 1038.123862  
## iter 110 value 1038.109701  
## iter 120 value 1038.106850  
## iter 130 value 1038.106471  
## final value 1038.106167   
## converged  
## # weights: 86  
## initial value 2213.479571   
## iter 10 value 1776.503118  
## iter 20 value 1167.500834  
## iter 30 value 1096.175220  
## iter 40 value 1069.580194  
## iter 50 value 1065.136452  
## iter 60 value 1063.421434  
## iter 70 value 1061.059516  
## iter 80 value 1060.211490  
## iter 90 value 1059.861148  
## iter 100 value 1059.227720  
## iter 110 value 1058.286313  
## iter 120 value 1057.537968  
## iter 130 value 1057.096260  
## iter 140 value 1056.892719  
## iter 150 value 1056.716703  
## iter 160 value 1056.333312  
## iter 170 value 1055.977085  
## iter 180 value 1055.560676  
## iter 190 value 1055.421290  
## iter 200 value 1055.283543  
## iter 210 value 1055.240754  
## iter 220 value 1055.235641  
## final value 1055.235619   
## converged  
## # weights: 86  
## initial value 1796.619262   
## iter 10 value 1422.012339  
## iter 20 value 1148.182100  
## iter 30 value 1107.223098  
## iter 40 value 1094.407522  
## iter 50 value 1090.810238  
## iter 60 value 1090.271230  
## iter 70 value 1090.001019  
## iter 80 value 1089.692785  
## iter 90 value 1089.478021  
## iter 100 value 1089.426956  
## iter 110 value 1089.379394  
## iter 120 value 1089.289968  
## iter 130 value 1089.145366  
## iter 140 value 1088.983164  
## iter 150 value 1088.844963  
## iter 160 value 1088.801633  
## iter 170 value 1088.788509  
## iter 180 value 1088.778678  
## iter 190 value 1088.772291  
## iter 200 value 1088.770590  
## iter 200 value 1088.770582  
## iter 200 value 1088.770582  
## final value 1088.770582   
## converged  
## # weights: 86  
## initial value 1944.465995   
## iter 10 value 1393.384256  
## iter 20 value 1239.116448  
## iter 30 value 1160.294551  
## iter 40 value 1135.911728  
## iter 50 value 1125.979836  
## iter 60 value 1117.651536  
## iter 70 value 1115.481609  
## iter 80 value 1114.952475  
## iter 90 value 1114.734406  
## iter 100 value 1114.604727  
## iter 110 value 1114.527032  
## iter 120 value 1114.384835  
## iter 130 value 1114.306802  
## iter 140 value 1114.254911  
## iter 150 value 1114.234413  
## iter 160 value 1114.186490  
## iter 170 value 1114.142269  
## iter 180 value 1114.076424  
## iter 190 value 1113.954728  
## iter 200 value 1113.936748  
## final value 1113.935227   
## converged  
## # weights: 86  
## initial value 3573.715919   
## final value 1912.000000   
## converged  
## # weights: 86  
## initial value 1492.494792   
## iter 10 value 1153.828831  
## iter 20 value 1075.882034  
## iter 30 value 1045.157523  
## iter 40 value 1039.313016  
## iter 50 value 1037.204639  
## iter 60 value 1035.618699  
## iter 70 value 1034.297911  
## iter 80 value 1033.484627  
## iter 90 value 1032.923066  
## iter 100 value 1032.613040  
## iter 110 value 1032.327230  
## iter 120 value 1031.866969  
## iter 130 value 1031.569879  
## iter 140 value 1031.372035  
## iter 150 value 1031.190083  
## iter 160 value 1031.009679  
## iter 170 value 1030.829618  
## iter 180 value 1030.740142  
## iter 190 value 1030.722616  
## iter 200 value 1030.713571  
## iter 210 value 1030.709545  
## iter 220 value 1030.708249  
## iter 230 value 1030.705443  
## iter 240 value 1030.695859  
## iter 250 value 1030.692089  
## iter 260 value 1030.686143  
## iter 270 value 1030.658017  
## iter 280 value 1030.653535  
## final value 1030.653384   
## converged  
## # weights: 86  
## initial value 2211.280649   
## iter 10 value 1454.418434  
## iter 20 value 1144.850790  
## iter 30 value 1100.756827  
## iter 40 value 1068.626642  
## iter 50 value 1058.667086  
## iter 60 value 1057.402845  
## iter 70 value 1057.146978  
## iter 80 value 1057.124815  
## iter 90 value 1057.020849  
## iter 100 value 1056.758679  
## iter 110 value 1056.504493  
## iter 120 value 1055.989576  
## iter 130 value 1055.373580  
## iter 140 value 1055.137093  
## iter 150 value 1055.058360  
## iter 160 value 1054.986955  
## iter 170 value 1054.875504  
## iter 180 value 1054.844670  
## iter 190 value 1054.831177  
## iter 200 value 1054.806342  
## iter 210 value 1054.769039  
## iter 220 value 1054.754764  
## iter 230 value 1054.752181  
## iter 240 value 1054.751068  
## final value 1054.750713   
## converged  
## # weights: 86  
## initial value 3006.851755   
## iter 10 value 1758.447440  
## iter 20 value 1144.190774  
## iter 30 value 1110.026521  
## iter 40 value 1094.529781  
## iter 50 value 1092.718322  
## iter 60 value 1089.767244  
## iter 70 value 1089.266985  
## iter 80 value 1089.132168  
## iter 90 value 1089.108307  
## iter 100 value 1089.094923  
## iter 110 value 1089.089650  
## iter 120 value 1089.082273  
## iter 130 value 1089.057922  
## iter 140 value 1089.000288  
## iter 150 value 1088.988559  
## iter 160 value 1088.919865  
## iter 170 value 1088.811174  
## iter 180 value 1088.775806  
## final value 1088.770958   
## converged  
## # weights: 86  
## initial value 2054.392281   
## iter 10 value 1411.401770  
## iter 20 value 1180.416797  
## iter 30 value 1126.727342  
## iter 40 value 1117.954554  
## iter 50 value 1116.100049  
## iter 60 value 1114.502004  
## iter 70 value 1113.901427  
## iter 80 value 1113.840197  
## iter 90 value 1113.820305  
## iter 100 value 1113.814472  
## iter 110 value 1113.813972  
## final value 1113.813916   
## converged  
## # weights: 86  
## initial value 1448.930716   
## iter 10 value 1133.970187  
## iter 20 value 1067.947409  
## iter 30 value 1026.059095  
## iter 40 value 1015.210891  
## iter 50 value 1004.565832  
## iter 60 value 1001.037928  
## iter 70 value 998.339635  
## iter 80 value 996.860439  
## iter 90 value 996.271925  
## iter 100 value 995.783043  
## iter 110 value 995.116824  
## iter 120 value 994.494131  
## iter 130 value 994.054979  
## iter 140 value 993.231810  
## iter 150 value 993.077551  
## iter 160 value 992.888997  
## iter 170 value 992.518403  
## iter 180 value 992.436708  
## iter 190 value 992.400338  
## iter 200 value 992.369525  
## iter 210 value 992.329500  
## iter 220 value 992.313951  
## iter 230 value 992.304851  
## iter 240 value 992.279032  
## iter 250 value 992.243532  
## iter 260 value 992.180441  
## iter 270 value 992.120434  
## iter 280 value 991.983744  
## iter 290 value 991.725652  
## iter 300 value 991.645930  
## iter 310 value 991.543961  
## iter 320 value 991.432846  
## iter 330 value 991.028828  
## iter 340 value 990.892002  
## iter 350 value 990.687130  
## iter 360 value 990.678303  
## iter 370 value 990.658819  
## iter 380 value 990.641233  
## iter 390 value 990.625248  
## iter 400 value 990.619641  
## iter 410 value 990.611718  
## iter 420 value 990.609522  
## iter 430 value 990.606268  
## iter 440 value 990.582355  
## iter 450 value 990.561871  
## iter 460 value 990.542417  
## iter 470 value 990.536354  
## iter 480 value 990.532471  
## iter 490 value 990.494076  
## iter 500 value 990.416234  
## iter 510 value 990.401641  
## iter 520 value 990.400986  
## iter 520 value 990.400979  
## final value 990.400979   
## converged  
## # weights: 86  
## initial value 1463.730384   
## iter 10 value 1196.963284  
## iter 20 value 1107.158342  
## iter 30 value 1061.274010  
## iter 40 value 1050.348691  
## iter 50 value 1046.629861  
## iter 60 value 1045.443057  
## iter 70 value 1041.692049  
## iter 80 value 1039.719947  
## iter 90 value 1037.438093  
## iter 100 value 1036.023940  
## iter 110 value 1035.768565  
## iter 120 value 1035.508947  
## iter 130 value 1035.387645  
## iter 140 value 1035.339065  
## iter 150 value 1035.301194  
## iter 160 value 1035.262924  
## iter 170 value 1035.250109  
## iter 180 value 1035.215837  
## iter 190 value 1035.052349  
## iter 200 value 1034.027067  
## iter 210 value 1033.602883  
## iter 220 value 1033.559217  
## iter 230 value 1033.553623  
## iter 240 value 1033.549083  
## final value 1033.548997   
## converged  
## # weights: 86  
## initial value 1683.285371   
## iter 10 value 1131.607346  
## iter 20 value 1077.090381  
## iter 30 value 1063.522582  
## iter 40 value 1059.717442  
## iter 50 value 1058.500956  
## iter 60 value 1057.826273  
## iter 70 value 1057.381157  
## iter 80 value 1057.284196  
## iter 90 value 1057.192552  
## iter 100 value 1056.908547  
## iter 110 value 1056.413139  
## iter 120 value 1056.059441  
## iter 130 value 1055.586246  
## iter 140 value 1055.427763  
## iter 150 value 1055.377373  
## iter 160 value 1055.340792  
## iter 170 value 1055.302429  
## iter 180 value 1055.269654  
## iter 190 value 1055.242597  
## iter 200 value 1055.235779  
## final value 1055.235681   
## converged  
## # weights: 86  
## initial value 2133.373143   
## iter 10 value 1450.813426  
## iter 20 value 1196.305246  
## iter 30 value 1128.259940  
## iter 40 value 1101.533797  
## iter 50 value 1098.271535  
## iter 60 value 1095.323663  
## iter 70 value 1090.984171  
## iter 80 value 1089.903595  
## iter 90 value 1089.327083  
## iter 100 value 1089.130900  
## iter 110 value 1089.000822  
## iter 120 value 1088.939950  
## iter 130 value 1088.858632  
## iter 140 value 1088.844228  
## iter 150 value 1088.831801  
## iter 160 value 1088.825708  
## iter 170 value 1088.816740  
## iter 180 value 1088.799029  
## iter 190 value 1088.781884  
## iter 200 value 1088.771151  
## final value 1088.770482   
## converged  
## # weights: 86  
## initial value 2017.450129   
## iter 10 value 1351.942653  
## iter 20 value 1183.628525  
## iter 30 value 1132.433090  
## iter 40 value 1119.804112  
## iter 50 value 1115.459959  
## iter 60 value 1114.738645  
## iter 70 value 1114.614453  
## iter 80 value 1114.325763  
## iter 90 value 1114.127177  
## iter 100 value 1114.057343  
## iter 110 value 1114.025258  
## iter 120 value 1113.969799  
## iter 130 value 1113.962740  
## iter 140 value 1113.947610  
## iter 150 value 1113.941397  
## iter 160 value 1113.935483  
## final value 1113.935242   
## converged  
## # weights: 86  
## initial value 2037.120393   
## final value 1912.000000   
## converged  
## # weights: 86  
## initial value 1869.802291   
## iter 10 value 1358.539130  
## iter 20 value 1175.558950  
## iter 30 value 1099.408090  
## iter 40 value 1074.937257  
## iter 50 value 1050.789333  
## iter 60 value 1041.379907  
## iter 70 value 1038.935242  
## iter 80 value 1037.911037  
## iter 90 value 1037.195523  
## iter 100 value 1035.550139  
## iter 110 value 1034.935758  
## iter 120 value 1034.120665  
## iter 130 value 1033.666884  
## iter 140 value 1033.420068  
## iter 150 value 1033.330198  
## iter 160 value 1033.215723  
## iter 170 value 1033.120561  
## iter 180 value 1033.072422  
## iter 190 value 1033.064514  
## iter 200 value 1033.059198  
## final value 1033.058776   
## converged  
## # weights: 86  
## initial value 3268.616361   
## iter 10 value 1729.151006  
## iter 20 value 1257.317426  
## iter 30 value 1143.888447  
## iter 40 value 1069.709155  
## iter 50 value 1062.255403  
## iter 60 value 1060.313356  
## iter 70 value 1058.190698  
## iter 80 value 1057.457642  
## iter 90 value 1057.074449  
## iter 100 value 1056.990979  
## iter 110 value 1056.873592  
## iter 120 value 1056.643210  
## iter 130 value 1056.488833  
## iter 140 value 1056.078320  
## iter 150 value 1055.597032  
## iter 160 value 1055.376881  
## iter 170 value 1055.215874  
## iter 180 value 1055.129006  
## final value 1055.123213   
## converged  
## # weights: 86  
## initial value 2751.657109   
## iter 10 value 1636.180550  
## iter 20 value 1225.796037  
## iter 30 value 1121.203690  
## iter 40 value 1100.622217  
## iter 50 value 1096.125581  
## iter 60 value 1094.696344  
## iter 70 value 1093.216977  
## iter 80 value 1091.820132  
## iter 90 value 1091.282099  
## iter 100 value 1090.879665  
## iter 110 value 1090.084223  
## iter 120 value 1089.499159  
## iter 130 value 1089.194116  
## iter 140 value 1088.856590  
## iter 150 value 1088.799814  
## iter 160 value 1088.781337  
## iter 170 value 1088.774419  
## iter 180 value 1088.772536  
## iter 190 value 1088.770663  
## final value 1088.770476   
## converged  
## # weights: 86  
## initial value 1727.323294   
## iter 10 value 1410.065872  
## iter 20 value 1214.973475  
## iter 30 value 1137.812596  
## iter 40 value 1117.355635  
## iter 50 value 1115.014760  
## iter 60 value 1114.484715  
## iter 70 value 1114.215225  
## iter 80 value 1113.980893  
## iter 90 value 1113.943698  
## iter 100 value 1113.888095  
## iter 110 value 1113.869629  
## iter 120 value 1113.833143  
## iter 130 value 1113.819148  
## iter 140 value 1113.816654  
## iter 150 value 1113.815442  
## iter 160 value 1113.813575  
## final value 1113.812824   
## converged  
## # weights: 103  
## initial value 2152.435003   
## final value 1912.000000   
## converged  
## # weights: 103  
## initial value 1590.862141   
## iter 10 value 1155.391391  
## iter 20 value 1080.557193  
## iter 30 value 1049.007863  
## iter 40 value 1040.791736  
## iter 50 value 1036.787781  
## iter 60 value 1035.483715  
## iter 70 value 1034.579338  
## iter 80 value 1033.432424  
## iter 90 value 1032.839230  
## iter 100 value 1032.454235  
## iter 110 value 1032.213589  
## iter 120 value 1031.834830  
## iter 130 value 1031.645818  
## iter 140 value 1031.568982  
## iter 150 value 1031.489370  
## iter 160 value 1031.433082  
## iter 170 value 1031.386965  
## iter 180 value 1031.350850  
## iter 190 value 1031.167783  
## iter 200 value 1030.895651  
## iter 210 value 1030.825037  
## iter 220 value 1030.777089  
## iter 230 value 1030.735070  
## iter 240 value 1030.686677  
## iter 250 value 1030.634864  
## iter 260 value 1030.632005  
## iter 270 value 1030.630485  
## final value 1030.630098   
## converged  
## # weights: 103  
## initial value 2104.407652   
## iter 10 value 1839.254724  
## iter 20 value 1209.073986  
## iter 30 value 1095.051699  
## iter 40 value 1063.459783  
## iter 50 value 1059.073659  
## iter 60 value 1057.303232  
## iter 70 value 1056.022264  
## iter 80 value 1055.352834  
## iter 90 value 1055.154857  
## iter 100 value 1055.128999  
## iter 110 value 1055.079913  
## iter 120 value 1054.857390  
## iter 130 value 1054.728286  
## iter 140 value 1054.639259  
## iter 150 value 1054.623795  
## iter 160 value 1054.620179  
## iter 170 value 1054.618901  
## iter 180 value 1054.616827  
## iter 190 value 1054.613653  
## iter 200 value 1054.612532  
## final value 1054.612335   
## converged  
## # weights: 103  
## initial value 3035.690937   
## iter 10 value 1439.174100  
## iter 20 value 1158.647994  
## iter 30 value 1122.769706  
## iter 40 value 1102.994176  
## iter 50 value 1093.104200  
## iter 60 value 1090.468453  
## iter 70 value 1089.366397  
## iter 80 value 1089.132644  
## iter 90 value 1088.985005  
## iter 100 value 1088.926530  
## iter 110 value 1088.856514  
## iter 120 value 1088.788872  
## iter 130 value 1088.740465  
## iter 140 value 1088.702280  
## iter 150 value 1088.673677  
## iter 160 value 1088.667935  
## iter 170 value 1088.664940  
## iter 180 value 1088.657627  
## iter 190 value 1088.656941  
## iter 200 value 1088.656436  
## iter 210 value 1088.655143  
## iter 220 value 1088.648531  
## final value 1088.648439   
## converged  
## # weights: 103  
## initial value 2092.660420   
## iter 10 value 1376.697970  
## iter 20 value 1184.690323  
## iter 30 value 1124.944635  
## iter 40 value 1117.802913  
## iter 50 value 1115.935182  
## iter 60 value 1115.282386  
## iter 70 value 1114.648274  
## iter 80 value 1114.268266  
## iter 90 value 1114.142535  
## iter 100 value 1114.069135  
## iter 110 value 1113.988588  
## iter 120 value 1113.878591  
## iter 130 value 1113.843834  
## iter 140 value 1113.827978  
## iter 150 value 1113.820961  
## iter 160 value 1113.802109  
## iter 170 value 1113.791056  
## iter 180 value 1113.782693  
## iter 190 value 1113.765706  
## iter 200 value 1113.760592  
## iter 210 value 1113.758541  
## final value 1113.758018   
## converged  
## # weights: 103  
## initial value 1830.168644   
## iter 10 value 1247.582430  
## iter 20 value 1099.837508  
## iter 30 value 1082.334211  
## iter 40 value 1081.025487  
## iter 50 value 1080.497996  
## iter 60 value 1074.974448  
## iter 70 value 1069.533966  
## iter 80 value 1068.443804  
## iter 90 value 1066.008255  
## iter 100 value 1041.689921  
## iter 110 value 1024.063495  
## iter 120 value 1021.113830  
## iter 130 value 1018.053634  
## iter 140 value 1011.667048  
## iter 150 value 1010.109264  
## iter 160 value 1009.613157  
## iter 170 value 1007.934294  
## iter 180 value 1006.728514  
## iter 190 value 1006.057405  
## iter 200 value 1004.996362  
## iter 210 value 1003.921852  
## iter 220 value 1003.441458  
## iter 230 value 1003.042007  
## iter 240 value 1002.919207  
## iter 250 value 1002.846926  
## iter 260 value 1002.661772  
## iter 270 value 1002.547033  
## iter 280 value 1002.436996  
## iter 290 value 1002.405932  
## iter 300 value 1002.389851  
## iter 310 value 1002.350885  
## iter 320 value 1002.284606  
## iter 330 value 1002.271437  
## iter 340 value 1002.255915  
## iter 350 value 1002.227134  
## iter 360 value 1002.176346  
## iter 370 value 1002.128984  
## iter 380 value 1002.105265  
## iter 390 value 1002.079258  
## iter 400 value 1002.048660  
## iter 410 value 1002.012635  
## iter 420 value 1001.959913  
## iter 430 value 1001.868921  
## iter 440 value 1001.324944  
## iter 450 value 1000.737410  
## iter 460 value 1000.220795  
## iter 470 value 1000.045986  
## iter 480 value 999.781825  
## iter 490 value 999.596817  
## iter 500 value 999.565273  
## iter 510 value 999.485765  
## iter 520 value 999.433204  
## iter 530 value 999.259086  
## iter 540 value 998.800711  
## iter 550 value 998.696498  
## iter 560 value 998.367996  
## iter 570 value 998.355430  
## iter 580 value 998.259448  
## iter 590 value 998.020495  
## iter 600 value 997.840769  
## final value 997.840769   
## stopped after 600 iterations  
## # weights: 103  
## initial value 2650.166128   
## iter 10 value 1480.642717  
## iter 20 value 1147.643728  
## iter 30 value 1073.708983  
## iter 40 value 1048.717107  
## iter 50 value 1036.264136  
## iter 60 value 1033.034687  
## iter 70 value 1031.928443  
## iter 80 value 1031.161824  
## iter 90 value 1030.818992  
## iter 100 value 1030.689552  
## iter 110 value 1030.628197  
## iter 120 value 1030.618634  
## iter 130 value 1030.613273  
## iter 140 value 1030.609246  
## iter 150 value 1030.603752  
## iter 160 value 1030.602152  
## iter 170 value 1030.594483  
## iter 180 value 1030.557476  
## iter 190 value 1030.500344  
## iter 200 value 1030.457347  
## iter 210 value 1030.442247  
## iter 220 value 1030.435808  
## iter 230 value 1030.421093  
## iter 240 value 1030.408612  
## iter 250 value 1030.393952  
## iter 260 value 1030.390631  
## final value 1030.390253   
## converged  
## # weights: 103  
## initial value 1561.589223   
## iter 10 value 1193.843224  
## iter 20 value 1090.206887  
## iter 30 value 1069.263519  
## iter 40 value 1062.280870  
## iter 50 value 1059.274473  
## iter 60 value 1057.297769  
## iter 70 value 1056.828418  
## iter 80 value 1056.439921  
## iter 90 value 1056.111954  
## iter 100 value 1055.941656  
## iter 110 value 1055.855647  
## iter 120 value 1055.629683  
## iter 130 value 1055.314466  
## iter 140 value 1055.142651  
## iter 150 value 1055.043518  
## iter 160 value 1055.001815  
## iter 170 value 1054.910010  
## iter 180 value 1054.812923  
## iter 190 value 1054.755880  
## iter 200 value 1054.678928  
## iter 210 value 1054.637047  
## iter 220 value 1054.593237  
## iter 230 value 1054.582177  
## final value 1054.581582   
## converged  
## # weights: 103  
## initial value 1701.498921   
## iter 10 value 1255.165155  
## iter 20 value 1145.314041  
## iter 30 value 1111.054140  
## iter 40 value 1097.717235  
## iter 50 value 1093.272567  
## iter 60 value 1091.648806  
## iter 70 value 1090.502076  
## iter 80 value 1089.901852  
## iter 90 value 1089.456558  
## iter 100 value 1089.108585  
## iter 110 value 1088.956353  
## iter 120 value 1088.834231  
## iter 130 value 1088.790924  
## iter 140 value 1088.786023  
## iter 150 value 1088.784247  
## iter 160 value 1088.782825  
## iter 170 value 1088.780815  
## iter 180 value 1088.776539  
## iter 190 value 1088.752844  
## iter 200 value 1088.735100  
## iter 210 value 1088.721905  
## iter 220 value 1088.652838  
## iter 230 value 1088.622526  
## iter 240 value 1088.617811  
## iter 250 value 1088.615874  
## final value 1088.615829   
## converged  
## # weights: 103  
## initial value 1641.325436   
## iter 10 value 1209.683922  
## iter 20 value 1133.129084  
## iter 30 value 1119.555608  
## iter 40 value 1116.040890  
## iter 50 value 1114.462438  
## iter 60 value 1113.909995  
## iter 70 value 1113.830101  
## iter 80 value 1113.691007  
## iter 90 value 1113.586799  
## iter 100 value 1113.557130  
## iter 110 value 1113.536297  
## iter 120 value 1113.526669  
## iter 130 value 1113.524058  
## iter 140 value 1113.516820  
## iter 150 value 1113.514602  
## iter 160 value 1113.513829  
## final value 1113.513782   
## converged  
## # weights: 103  
## initial value 1691.070333   
## iter 10 value 1173.247521  
## iter 20 value 1073.528316  
## iter 30 value 1028.146008  
## iter 40 value 1008.536101  
## iter 50 value 1001.320255  
## iter 60 value 995.539173  
## iter 70 value 993.255344  
## iter 80 value 992.264815  
## iter 90 value 991.765286  
## iter 100 value 991.473696  
## iter 110 value 990.712370  
## iter 120 value 990.413566  
## iter 130 value 989.989032  
## iter 140 value 989.643770  
## iter 150 value 989.527530  
## iter 160 value 989.498462  
## iter 170 value 989.459369  
## iter 180 value 989.428475  
## iter 190 value 989.341490  
## iter 200 value 989.194196  
## iter 210 value 988.987744  
## iter 220 value 988.928498  
## iter 230 value 988.803170  
## iter 240 value 988.480056  
## iter 250 value 988.108056  
## iter 260 value 987.989074  
## iter 270 value 987.914315  
## iter 280 value 987.782384  
## iter 290 value 987.460000  
## iter 300 value 987.259241  
## iter 310 value 987.201004  
## iter 320 value 986.951903  
## iter 330 value 986.824464  
## iter 340 value 986.580486  
## iter 350 value 986.490268  
## iter 360 value 986.370112  
## iter 370 value 986.239711  
## iter 380 value 986.000187  
## iter 390 value 985.503072  
## iter 400 value 985.191361  
## iter 410 value 984.813201  
## iter 420 value 984.076600  
## iter 430 value 983.645644  
## iter 440 value 983.312091  
## iter 450 value 983.168566  
## iter 460 value 983.031991  
## iter 470 value 982.890630  
## iter 480 value 982.767310  
## iter 490 value 982.579321  
## iter 500 value 982.435230  
## iter 510 value 982.308067  
## iter 520 value 982.303978  
## iter 530 value 982.281797  
## iter 540 value 982.193192  
## iter 550 value 982.084243  
## iter 560 value 982.030581  
## iter 570 value 981.981030  
## iter 580 value 981.956839  
## iter 590 value 981.928118  
## iter 600 value 981.821348  
## iter 610 value 981.717851  
## iter 620 value 981.668193  
## iter 630 value 981.548806  
## iter 640 value 981.388024  
## iter 650 value 981.140286  
## iter 660 value 981.101008  
## iter 670 value 981.039228  
## iter 680 value 980.942438  
## iter 690 value 980.881317  
## iter 700 value 980.852536  
## final value 980.852536   
## stopped after 700 iterations  
## # weights: 103  
## initial value 2391.867712   
## iter 10 value 1311.918740  
## iter 20 value 1105.875731  
## iter 30 value 1060.673300  
## iter 40 value 1041.929051  
## iter 50 value 1034.950673  
## iter 60 value 1032.151977  
## iter 70 value 1031.029049  
## iter 80 value 1030.875469  
## iter 90 value 1030.804357  
## iter 100 value 1030.753143  
## iter 110 value 1030.724844  
## iter 120 value 1030.703247  
## iter 130 value 1030.694693  
## iter 140 value 1030.682364  
## iter 150 value 1030.666662  
## iter 160 value 1030.647383  
## iter 170 value 1030.606741  
## iter 180 value 1030.596759  
## iter 190 value 1030.586591  
## iter 200 value 1030.571256  
## iter 210 value 1030.556113  
## iter 220 value 1030.543010  
## iter 230 value 1030.519353  
## iter 240 value 1030.499098  
## iter 250 value 1030.480234  
## iter 260 value 1030.473754  
## final value 1030.473497   
## converged  
## # weights: 103  
## initial value 2917.917277   
## iter 10 value 1661.821550  
## iter 20 value 1171.097216  
## iter 30 value 1109.282988  
## iter 40 value 1074.829700  
## iter 50 value 1062.314369  
## iter 60 value 1059.083473  
## iter 70 value 1057.800790  
## iter 80 value 1057.200541  
## iter 90 value 1056.445447  
## iter 100 value 1055.535042  
## iter 110 value 1055.250166  
## iter 120 value 1055.071601  
## iter 130 value 1055.002420  
## iter 140 value 1054.972014  
## iter 150 value 1054.958092  
## iter 160 value 1054.934981  
## iter 170 value 1054.878609  
## iter 180 value 1054.782611  
## iter 190 value 1054.732312  
## iter 200 value 1054.696862  
## iter 210 value 1054.668964  
## iter 220 value 1054.655653  
## iter 230 value 1054.641952  
## iter 240 value 1054.632345  
## iter 250 value 1054.628360  
## final value 1054.627809   
## converged  
## # weights: 103  
## initial value 1534.576804   
## iter 10 value 1225.506059  
## iter 20 value 1146.889152  
## iter 30 value 1105.091912  
## iter 40 value 1102.086140  
## iter 50 value 1099.092285  
## iter 60 value 1095.553388  
## iter 70 value 1094.656238  
## iter 80 value 1093.924630  
## iter 90 value 1092.751008  
## iter 100 value 1091.998475  
## iter 110 value 1091.403040  
## iter 120 value 1090.867072  
## iter 130 value 1090.579279  
## iter 140 value 1090.196444  
## iter 150 value 1089.742895  
## iter 160 value 1089.472208  
## iter 170 value 1089.316652  
## iter 180 value 1089.227638  
## iter 190 value 1089.214154  
## iter 200 value 1089.205507  
## iter 210 value 1089.194682  
## iter 220 value 1089.176412  
## iter 230 value 1089.170193  
## final value 1089.170092   
## converged  
## # weights: 103  
## initial value 2398.293800   
## iter 10 value 1380.432839  
## iter 20 value 1192.056730  
## iter 30 value 1136.756731  
## iter 40 value 1122.909815  
## iter 50 value 1116.318502  
## iter 60 value 1115.463260  
## iter 70 value 1114.403633  
## iter 80 value 1114.096082  
## iter 90 value 1113.959020  
## iter 100 value 1113.822354  
## iter 110 value 1113.704287  
## iter 120 value 1113.572162  
## iter 130 value 1113.538397  
## iter 140 value 1113.526728  
## iter 150 value 1113.516370  
## iter 160 value 1113.514416  
## iter 170 value 1113.514061  
## final value 1113.513723   
## converged  
## # weights: 103  
## initial value 2136.720087   
## final value 1912.000000   
## converged  
## # weights: 103  
## initial value 1905.387503   
## iter 10 value 1345.018541  
## iter 20 value 1178.717714  
## iter 30 value 1105.657133  
## iter 40 value 1055.289625  
## iter 50 value 1042.286253  
## iter 60 value 1039.303716  
## iter 70 value 1038.491364  
## iter 80 value 1037.356698  
## iter 90 value 1036.566514  
## iter 100 value 1035.652416  
## iter 110 value 1034.788083  
## iter 120 value 1034.064922  
## iter 130 value 1033.501684  
## iter 140 value 1033.040972  
## iter 150 value 1032.632328  
## iter 160 value 1032.376148  
## iter 170 value 1032.226598  
## iter 180 value 1031.575686  
## iter 190 value 1030.988912  
## iter 200 value 1030.819930  
## iter 210 value 1030.635861  
## iter 220 value 1030.575180  
## iter 230 value 1030.402061  
## iter 240 value 1030.346356  
## iter 250 value 1030.334243  
## iter 260 value 1030.332861  
## final value 1030.332649   
## converged  
## # weights: 103  
## initial value 1918.866551   
## iter 10 value 1351.579841  
## iter 20 value 1173.836266  
## iter 30 value 1130.710666  
## iter 40 value 1093.119775  
## iter 50 value 1064.301927  
## iter 60 value 1057.808137  
## iter 70 value 1056.009229  
## iter 80 value 1055.454383  
## iter 90 value 1055.136481  
## iter 100 value 1054.876258  
## iter 110 value 1054.615815  
## iter 120 value 1054.590271  
## iter 130 value 1054.587206  
## iter 140 value 1054.585139  
## iter 150 value 1054.583904  
## iter 160 value 1054.582856  
## iter 170 value 1054.580680  
## iter 180 value 1054.578353  
## iter 190 value 1054.577042  
## iter 190 value 1054.577032  
## iter 190 value 1054.577032  
## final value 1054.577032   
## converged  
## # weights: 103  
## initial value 2686.452251   
## iter 10 value 1515.859654  
## iter 20 value 1304.524331  
## iter 30 value 1144.056174  
## iter 40 value 1108.704103  
## iter 50 value 1099.064373  
## iter 60 value 1096.180840  
## iter 70 value 1093.398409  
## iter 80 value 1091.894465  
## iter 90 value 1091.441899  
## iter 100 value 1090.929384  
## iter 110 value 1090.492084  
## iter 120 value 1090.292541  
## iter 130 value 1090.071103  
## iter 140 value 1089.906984  
## iter 150 value 1089.800425  
## iter 160 value 1089.658909  
## iter 170 value 1089.557155  
## iter 180 value 1089.501320  
## iter 190 value 1089.475907  
## iter 200 value 1089.451999  
## iter 210 value 1089.407135  
## iter 220 value 1089.347298  
## iter 230 value 1089.317499  
## iter 240 value 1089.269129  
## iter 250 value 1089.262796  
## final value 1089.262716   
## converged  
## # weights: 103  
## initial value 1503.612410   
## iter 10 value 1258.800896  
## iter 20 value 1140.558467  
## iter 30 value 1118.859027  
## iter 40 value 1114.680683  
## iter 50 value 1114.064740  
## iter 60 value 1113.889727  
## iter 70 value 1113.804832  
## iter 80 value 1113.729979  
## iter 90 value 1113.705397  
## iter 100 value 1113.689596  
## iter 110 value 1113.676511  
## iter 120 value 1113.657132  
## iter 130 value 1113.647621  
## iter 140 value 1113.634736  
## iter 150 value 1113.626683  
## iter 160 value 1113.614268  
## iter 170 value 1113.613307  
## iter 180 value 1113.612045  
## final value 1113.612007   
## converged  
## # weights: 103  
## initial value 3267.941868   
## final value 1912.000000   
## converged  
## # weights: 103  
## initial value 1644.025864   
## iter 10 value 1146.732482  
## iter 20 value 1083.002577  
## iter 30 value 1046.844765  
## iter 40 value 1040.442303  
## iter 50 value 1037.792312  
## iter 60 value 1035.609099  
## iter 70 value 1034.118395  
## iter 80 value 1032.938434  
## iter 90 value 1031.996352  
## iter 100 value 1031.171709  
## iter 110 value 1030.835577  
## iter 120 value 1030.765253  
## iter 130 value 1030.736458  
## iter 140 value 1030.716809  
## iter 150 value 1030.695524  
## iter 160 value 1030.668922  
## iter 170 value 1030.602930  
## iter 180 value 1030.568028  
## iter 190 value 1030.557232  
## iter 200 value 1030.554762  
## iter 210 value 1030.551132  
## iter 220 value 1030.548054  
## iter 230 value 1030.543977  
## iter 240 value 1030.542492  
## final value 1030.542453   
## converged  
## # weights: 103  
## initial value 2490.175247   
## iter 10 value 1870.825499  
## iter 20 value 1223.543820  
## iter 30 value 1086.690539  
## iter 40 value 1060.553698  
## iter 50 value 1057.551615  
## iter 60 value 1056.036569  
## iter 70 value 1055.751688  
## iter 80 value 1055.625873  
## iter 90 value 1055.515608  
## iter 100 value 1055.353976  
## iter 110 value 1055.255078  
## iter 120 value 1055.145487  
## iter 130 value 1055.031951  
## iter 140 value 1054.911877  
## iter 150 value 1054.871488  
## iter 160 value 1054.852533  
## iter 170 value 1054.828097  
## iter 180 value 1054.793941  
## iter 190 value 1054.643264  
## iter 200 value 1054.609451  
## iter 210 value 1054.602719  
## iter 220 value 1054.595522  
## iter 230 value 1054.588203  
## iter 240 value 1054.583090  
## iter 250 value 1054.582202  
## iter 260 value 1054.581525  
## iter 260 value 1054.581516  
## iter 260 value 1054.581513  
## final value 1054.581513   
## converged  
## # weights: 103  
## initial value 1633.918871   
## iter 10 value 1133.832955  
## iter 20 value 1104.362644  
## iter 30 value 1093.201244  
## iter 40 value 1090.244699  
## iter 50 value 1089.499716  
## iter 60 value 1089.285381  
## iter 70 value 1089.135770  
## iter 80 value 1089.002791  
## iter 90 value 1088.879248  
## iter 100 value 1088.788972  
## iter 110 value 1088.770771  
## iter 120 value 1088.756455  
## iter 130 value 1088.748995  
## iter 140 value 1088.734887  
## iter 150 value 1088.699033  
## iter 160 value 1088.679324  
## iter 170 value 1088.674999  
## iter 180 value 1088.670464  
## iter 190 value 1088.666497  
## iter 200 value 1088.664028  
## final value 1088.663756   
## converged  
## # weights: 103  
## initial value 1488.333776   
## iter 10 value 1220.963865  
## iter 20 value 1137.557631  
## iter 30 value 1121.017558  
## iter 40 value 1117.367486  
## iter 50 value 1115.836122  
## iter 60 value 1115.439425  
## iter 70 value 1115.018082  
## iter 80 value 1114.198425  
## iter 90 value 1113.838880  
## iter 100 value 1113.659297  
## iter 110 value 1113.609647  
## iter 120 value 1113.593454  
## iter 130 value 1113.566802  
## iter 140 value 1113.540904  
## iter 150 value 1113.525598  
## iter 160 value 1113.523557  
## iter 170 value 1113.517157  
## iter 180 value 1113.516100  
## final value 1113.516078   
## converged  
## # weights: 103  
## initial value 2586.662772   
## final value 1912.000000   
## converged  
## # weights: 103  
## initial value 2382.891947   
## iter 10 value 1662.950848  
## iter 20 value 1129.919819  
## iter 30 value 1063.210939  
## iter 40 value 1046.319700  
## iter 50 value 1039.598050  
## iter 60 value 1035.555666  
## iter 70 value 1033.289936  
## iter 80 value 1032.595184  
## iter 90 value 1031.817077  
## iter 100 value 1031.276496  
## iter 110 value 1030.959635  
## iter 120 value 1030.799906  
## iter 130 value 1030.621408  
## iter 140 value 1030.289989  
## iter 150 value 1030.135101  
## iter 160 value 1029.998492  
## iter 170 value 1029.962465  
## iter 180 value 1029.953054  
## iter 190 value 1029.909900  
## iter 200 value 1029.883848  
## iter 210 value 1029.879945  
## final value 1029.879120   
## converged  
## # weights: 103  
## initial value 2618.481375   
## iter 10 value 1904.263422  
## iter 20 value 1186.340864  
## iter 30 value 1108.438488  
## iter 40 value 1074.150901  
## iter 50 value 1062.559649  
## iter 60 value 1059.314651  
## iter 70 value 1057.572444  
## iter 80 value 1056.397870  
## iter 90 value 1055.750492  
## iter 100 value 1055.480861  
## iter 110 value 1055.249822  
## iter 120 value 1054.999458  
## iter 130 value 1054.910824  
## iter 140 value 1054.874650  
## iter 150 value 1054.842170  
## iter 160 value 1054.819330  
## iter 170 value 1054.804341  
## iter 180 value 1054.793247  
## iter 190 value 1054.774892  
## iter 200 value 1054.753391  
## iter 210 value 1054.721658  
## iter 220 value 1054.662091  
## iter 230 value 1054.620973  
## iter 240 value 1054.595455  
## iter 250 value 1054.588660  
## iter 260 value 1054.583292  
## iter 270 value 1054.581622  
## final value 1054.581510   
## converged  
## # weights: 103  
## initial value 2832.057743   
## iter 10 value 1825.791947  
## iter 20 value 1178.931688  
## iter 30 value 1110.815050  
## iter 40 value 1097.258600  
## iter 50 value 1092.416870  
## iter 60 value 1091.050978  
## iter 70 value 1089.800723  
## iter 80 value 1089.257273  
## iter 90 value 1088.908581  
## iter 100 value 1088.761729  
## iter 110 value 1088.685028  
## iter 120 value 1088.670118  
## iter 130 value 1088.666437  
## iter 140 value 1088.665090  
## final value 1088.664832   
## converged  
## # weights: 103  
## initial value 2360.051075   
## iter 10 value 1442.929815  
## iter 20 value 1238.994825  
## iter 30 value 1153.080318  
## iter 40 value 1132.646012  
## iter 50 value 1121.808450  
## iter 60 value 1116.555578  
## iter 70 value 1115.321992  
## iter 80 value 1114.731451  
## iter 90 value 1114.472895  
## iter 100 value 1114.288340  
## iter 110 value 1114.200366  
## iter 120 value 1114.104645  
## iter 130 value 1114.034791  
## iter 140 value 1113.959421  
## iter 150 value 1113.908669  
## iter 160 value 1113.853305  
## iter 170 value 1113.802385  
## iter 180 value 1113.769002  
## iter 190 value 1113.759467  
## iter 200 value 1113.758347  
## iter 210 value 1113.758146  
## final value 1113.758053   
## converged  
## # weights: 120  
## initial value 2953.764590   
## final value 1912.000000   
## converged  
## # weights: 120  
## initial value 2540.607836   
## iter 10 value 1835.366872  
## iter 20 value 1157.308679  
## iter 30 value 1083.191553  
## iter 40 value 1047.007029  
## iter 50 value 1037.352840  
## iter 60 value 1033.440579  
## iter 70 value 1031.627590  
## iter 80 value 1030.894239  
## iter 90 value 1030.522680  
## iter 100 value 1030.365744  
## iter 110 value 1030.113956  
## iter 120 value 1029.999886  
## iter 130 value 1029.968687  
## iter 140 value 1029.952445  
## iter 150 value 1029.938069  
## iter 160 value 1029.925743  
## iter 170 value 1029.918221  
## iter 180 value 1029.914243  
## iter 190 value 1029.911347  
## iter 200 value 1029.909650  
## iter 210 value 1029.907745  
## iter 220 value 1029.902853  
## iter 230 value 1029.893855  
## iter 240 value 1029.889841  
## iter 250 value 1029.886536  
## iter 260 value 1029.881712  
## iter 270 value 1029.863938  
## final value 1029.860207   
## converged  
## # weights: 120  
## initial value 1714.819931   
## iter 10 value 1176.160401  
## iter 20 value 1079.851712  
## iter 30 value 1066.093572  
## iter 40 value 1064.478204  
## iter 50 value 1063.268338  
## iter 60 value 1060.921213  
## iter 70 value 1059.200005  
## iter 80 value 1057.997610  
## iter 90 value 1056.946772  
## iter 100 value 1056.155366  
## iter 110 value 1055.843073  
## iter 120 value 1055.571141  
## iter 130 value 1055.364101  
## iter 140 value 1055.291620  
## iter 150 value 1055.212442  
## iter 160 value 1055.150809  
## iter 170 value 1055.062288  
## iter 180 value 1054.986493  
## iter 190 value 1054.915049  
## iter 200 value 1054.839758  
## iter 210 value 1054.809815  
## iter 220 value 1054.792407  
## iter 230 value 1054.769829  
## iter 240 value 1054.739695  
## iter 250 value 1054.703204  
## iter 260 value 1054.662622  
## iter 270 value 1054.622145  
## iter 280 value 1054.615619  
## iter 290 value 1054.614310  
## iter 300 value 1054.610349  
## final value 1054.609907   
## converged  
## # weights: 120  
## initial value 1754.996437   
## iter 10 value 1151.021420  
## iter 20 value 1105.871896  
## iter 30 value 1093.309793  
## iter 40 value 1090.284823  
## iter 50 value 1089.814229  
## iter 60 value 1089.598282  
## iter 70 value 1089.416257  
## iter 80 value 1089.351862  
## iter 90 value 1089.279319  
## iter 100 value 1089.121565  
## iter 110 value 1089.016591  
## iter 120 value 1088.906769  
## iter 130 value 1088.843782  
## iter 140 value 1088.819251  
## iter 150 value 1088.797552  
## iter 160 value 1088.780771  
## iter 170 value 1088.773015  
## iter 180 value 1088.766615  
## iter 190 value 1088.764593  
## iter 200 value 1088.762421  
## iter 210 value 1088.761612  
## iter 220 value 1088.761074  
## iter 230 value 1088.759547  
## iter 240 value 1088.758772  
## iter 240 value 1088.758765  
## iter 240 value 1088.758764  
## final value 1088.758764   
## converged  
## # weights: 120  
## initial value 2828.807706   
## iter 10 value 1327.465007  
## iter 20 value 1150.706464  
## iter 30 value 1123.229439  
## iter 40 value 1118.170625  
## iter 50 value 1116.039829  
## iter 60 value 1114.657401  
## iter 70 value 1114.123605  
## iter 80 value 1113.800798  
## iter 90 value 1113.572631  
## iter 100 value 1113.399960  
## iter 110 value 1113.332428  
## iter 120 value 1113.314009  
## iter 130 value 1113.308755  
## iter 140 value 1113.296549  
## iter 150 value 1113.291709  
## iter 160 value 1113.287367  
## iter 170 value 1113.286322  
## iter 180 value 1113.285777  
## final value 1113.285681   
## converged  
## # weights: 120  
## initial value 2490.915223   
## final value 1912.000000   
## converged  
## # weights: 120  
## initial value 1604.312869   
## iter 10 value 1121.502819  
## iter 20 value 1074.743508  
## iter 30 value 1044.112472  
## iter 40 value 1036.188145  
## iter 50 value 1034.596699  
## iter 60 value 1033.713230  
## iter 70 value 1033.300473  
## iter 80 value 1032.770168  
## iter 90 value 1032.449952  
## iter 100 value 1032.165580  
## iter 110 value 1031.833243  
## iter 120 value 1031.492445  
## iter 130 value 1031.334318  
## iter 140 value 1031.283431  
## iter 150 value 1031.250697  
## iter 160 value 1031.209921  
## iter 170 value 1031.196080  
## iter 180 value 1031.179493  
## iter 190 value 1031.169574  
## iter 200 value 1031.165200  
## iter 210 value 1031.162969  
## iter 220 value 1031.161365  
## iter 230 value 1031.159669  
## iter 240 value 1031.158486  
## final value 1031.158140   
## converged  
## # weights: 120  
## initial value 2267.678408   
## iter 10 value 1818.452204  
## iter 20 value 1139.814597  
## iter 30 value 1080.018560  
## iter 40 value 1060.490073  
## iter 50 value 1058.619838  
## iter 60 value 1057.984862  
## iter 70 value 1057.248989  
## iter 80 value 1055.861195  
## iter 90 value 1055.141154  
## iter 100 value 1054.943953  
## iter 110 value 1054.912075  
## iter 120 value 1054.887129  
## iter 130 value 1054.837133  
## iter 140 value 1054.773617  
## iter 150 value 1054.702350  
## iter 160 value 1054.638350  
## iter 170 value 1054.621032  
## iter 180 value 1054.610098  
## iter 190 value 1054.602217  
## iter 200 value 1054.598805  
## iter 210 value 1054.596108  
## iter 220 value 1054.591551  
## iter 230 value 1054.581257  
## iter 240 value 1054.577590  
## iter 250 value 1054.575173  
## iter 260 value 1054.572284  
## iter 270 value 1054.562660  
## iter 280 value 1054.553958  
## iter 290 value 1054.551869  
## final value 1054.551736   
## converged  
## # weights: 120  
## initial value 1484.561942   
## iter 10 value 1234.853332  
## iter 20 value 1123.481273  
## iter 30 value 1099.286703  
## iter 40 value 1095.670885  
## iter 50 value 1093.333383  
## iter 60 value 1091.595403  
## iter 70 value 1090.675900  
## iter 80 value 1089.944211  
## iter 90 value 1089.411236  
## iter 100 value 1089.057737  
## iter 110 value 1088.871133  
## iter 120 value 1088.785825  
## iter 130 value 1088.746898  
## iter 140 value 1088.687279  
## iter 150 value 1088.614453  
## iter 160 value 1088.580355  
## iter 170 value 1088.550511  
## iter 180 value 1088.527088  
## iter 190 value 1088.504387  
## iter 200 value 1088.485623  
## iter 210 value 1088.480135  
## iter 220 value 1088.476343  
## iter 230 value 1088.469857  
## iter 240 value 1088.468049  
## final value 1088.467986   
## converged  
## # weights: 120  
## initial value 1486.112831   
## iter 10 value 1207.577058  
## iter 20 value 1149.801635  
## iter 30 value 1129.827535  
## iter 40 value 1118.842501  
## iter 50 value 1115.842443  
## iter 60 value 1115.139341  
## iter 70 value 1114.682255  
## iter 80 value 1114.469469  
## iter 90 value 1114.312001  
## iter 100 value 1114.089217  
## iter 110 value 1113.816183  
## iter 120 value 1113.608180  
## iter 130 value 1113.548019  
## iter 140 value 1113.508049  
## iter 150 value 1113.419864  
## iter 160 value 1113.370517  
## iter 170 value 1113.346045  
## iter 180 value 1113.320752  
## iter 190 value 1113.309899  
## iter 200 value 1113.305973  
## iter 210 value 1113.303368  
## iter 220 value 1113.300402  
## iter 230 value 1113.292820  
## iter 240 value 1113.288812  
## final value 1113.288162   
## converged  
## # weights: 120  
## initial value 2285.166146   
## final value 1912.000000   
## converged  
## # weights: 120  
## initial value 1515.512255   
## iter 10 value 1148.256058  
## iter 20 value 1086.538069  
## iter 30 value 1047.549187  
## iter 40 value 1039.493114  
## iter 50 value 1034.869794  
## iter 60 value 1032.701608  
## iter 70 value 1031.893285  
## iter 80 value 1031.414311  
## iter 90 value 1031.124314  
## iter 100 value 1030.742888  
## iter 110 value 1030.339096  
## iter 120 value 1030.139340  
## iter 130 value 1030.067945  
## iter 140 value 1030.005758  
## iter 150 value 1029.967189  
## iter 160 value 1029.942877  
## iter 170 value 1029.913053  
## iter 180 value 1029.891871  
## iter 190 value 1029.882662  
## iter 200 value 1029.876642  
## iter 210 value 1029.873596  
## iter 220 value 1029.867889  
## iter 230 value 1029.853351  
## iter 240 value 1029.833919  
## iter 250 value 1029.823603  
## iter 260 value 1029.803207  
## iter 270 value 1029.793106  
## iter 280 value 1029.791047  
## iter 280 value 1029.791037  
## iter 280 value 1029.791036  
## final value 1029.791036   
## converged  
## # weights: 120  
## initial value 1741.823780   
## iter 10 value 1123.251526  
## iter 20 value 1074.784882  
## iter 30 value 1061.021837  
## iter 40 value 1057.613033  
## iter 50 value 1056.477964  
## iter 60 value 1056.215702  
## iter 70 value 1056.154833  
## iter 80 value 1056.030053  
## iter 90 value 1055.761639  
## iter 100 value 1055.550077  
## iter 110 value 1055.451303  
## iter 120 value 1055.354091  
## iter 130 value 1055.268149  
## iter 140 value 1055.203737  
## iter 150 value 1055.146246  
## iter 160 value 1055.043289  
## iter 170 value 1055.015151  
## iter 180 value 1054.997601  
## iter 190 value 1054.988423  
## iter 200 value 1054.966450  
## iter 210 value 1054.948866  
## iter 220 value 1054.943959  
## iter 230 value 1054.940621  
## iter 240 value 1054.934105  
## iter 250 value 1054.931948  
## iter 260 value 1054.929766  
## iter 270 value 1054.928647  
## final value 1054.928574   
## converged  
## # weights: 120  
## initial value 3013.828479   
## iter 10 value 1588.008505  
## iter 20 value 1205.340251  
## iter 30 value 1130.525121  
## iter 40 value 1103.905664  
## iter 50 value 1091.216837  
## iter 60 value 1089.542577  
## iter 70 value 1088.889003  
## iter 80 value 1088.736929  
## iter 90 value 1088.625548  
## iter 100 value 1088.605435  
## iter 110 value 1088.579226  
## iter 120 value 1088.555192  
## iter 130 value 1088.538793  
## iter 140 value 1088.532741  
## iter 150 value 1088.529569  
## iter 160 value 1088.525267  
## iter 170 value 1088.505522  
## iter 180 value 1088.493275  
## iter 190 value 1088.490052  
## iter 200 value 1088.488186  
## iter 210 value 1088.474940  
## iter 220 value 1088.470784  
## iter 220 value 1088.470780  
## iter 220 value 1088.470780  
## final value 1088.470780   
## converged  
## # weights: 120  
## initial value 3207.682498   
## iter 10 value 1373.266290  
## iter 20 value 1193.131184  
## iter 30 value 1128.019836  
## iter 40 value 1120.181399  
## iter 50 value 1118.120237  
## iter 60 value 1117.395349  
## iter 70 value 1116.557908  
## iter 80 value 1115.692400  
## iter 90 value 1115.087206  
## iter 100 value 1114.683254  
## iter 110 value 1114.154051  
## iter 120 value 1113.730031  
## iter 130 value 1113.663275  
## iter 140 value 1113.651280  
## iter 150 value 1113.643663  
## iter 160 value 1113.618121  
## iter 170 value 1113.478987  
## iter 180 value 1113.347947  
## iter 190 value 1113.296374  
## iter 200 value 1113.289421  
## iter 210 value 1113.286508  
## iter 220 value 1113.285911  
## final value 1113.285823   
## converged  
## # weights: 120  
## initial value 1594.392975   
## iter 10 value 1100.130580  
## iter 20 value 1047.324328  
## iter 30 value 1010.593678  
## iter 40 value 999.818652  
## iter 50 value 993.976060  
## iter 60 value 991.146316  
## iter 70 value 989.001394  
## iter 80 value 987.203622  
## iter 90 value 985.885251  
## iter 100 value 984.900434  
## iter 110 value 984.235839  
## iter 120 value 983.569753  
## iter 130 value 983.114332  
## iter 140 value 982.760305  
## iter 150 value 982.511930  
## iter 160 value 982.282977  
## iter 170 value 982.025061  
## iter 180 value 981.666233  
## iter 190 value 981.392748  
## iter 200 value 981.133129  
## iter 210 value 980.937214  
## iter 220 value 980.844907  
## iter 230 value 980.761589  
## iter 240 value 980.705103  
## iter 250 value 980.681438  
## iter 260 value 980.624356  
## iter 270 value 980.573032  
## iter 280 value 980.545727  
## iter 290 value 980.513278  
## iter 300 value 980.491640  
## iter 310 value 980.465455  
## iter 320 value 980.435332  
## iter 330 value 980.386027  
## iter 340 value 980.285643  
## iter 350 value 980.251048  
## iter 360 value 980.181357  
## iter 370 value 979.988866  
## iter 380 value 979.810673  
## iter 390 value 979.622483  
## iter 400 value 979.193437  
## iter 410 value 978.995153  
## iter 420 value 978.919925  
## iter 430 value 978.886893  
## iter 440 value 978.845111  
## iter 450 value 978.803467  
## iter 460 value 978.770823  
## iter 470 value 978.741302  
## iter 480 value 978.522803  
## iter 490 value 978.420278  
## iter 500 value 978.398609  
## iter 510 value 978.388852  
## iter 520 value 978.375787  
## iter 530 value 978.368559  
## iter 540 value 978.363000  
## iter 550 value 978.353109  
## iter 560 value 978.345111  
## iter 570 value 978.337406  
## iter 580 value 978.333833  
## iter 590 value 978.330577  
## iter 600 value 978.329121  
## iter 610 value 978.328383  
## iter 620 value 978.326973  
## iter 630 value 978.325532  
## iter 640 value 978.317993  
## iter 650 value 978.309013  
## iter 660 value 978.304778  
## iter 670 value 978.299385  
## iter 680 value 978.291522  
## iter 690 value 978.253947  
## final value 978.248201   
## converged  
## # weights: 120  
## initial value 1455.746559   
## iter 10 value 1130.794975  
## iter 20 value 1079.278062  
## iter 30 value 1045.559900  
## iter 40 value 1034.000798  
## iter 50 value 1032.191247  
## iter 60 value 1031.548938  
## iter 70 value 1031.234628  
## iter 80 value 1031.064149  
## iter 90 value 1030.933464  
## iter 100 value 1030.793638  
## iter 110 value 1030.714863  
## iter 120 value 1030.670812  
## iter 130 value 1030.640348  
## iter 140 value 1030.617414  
## iter 150 value 1030.604445  
## iter 160 value 1030.593560  
## iter 170 value 1030.591122  
## iter 180 value 1030.590207  
## iter 190 value 1030.589338  
## iter 200 value 1030.588395  
## iter 210 value 1030.587994  
## iter 220 value 1030.587371  
## iter 230 value 1030.585733  
## iter 240 value 1030.584783  
## final value 1030.584693   
## converged  
## # weights: 120  
## initial value 2897.361693   
## iter 10 value 1420.004764  
## iter 20 value 1119.593400  
## iter 30 value 1073.996687  
## iter 40 value 1058.940650  
## iter 50 value 1056.136319  
## iter 60 value 1055.374913  
## iter 70 value 1055.047973  
## iter 80 value 1054.913899  
## iter 90 value 1054.851748  
## iter 100 value 1054.836741  
## iter 110 value 1054.826600  
## iter 120 value 1054.812153  
## iter 130 value 1054.784646  
## iter 140 value 1054.734468  
## iter 150 value 1054.667160  
## iter 160 value 1054.640139  
## iter 170 value 1054.634801  
## iter 180 value 1054.627996  
## iter 190 value 1054.624465  
## iter 200 value 1054.622704  
## iter 210 value 1054.615504  
## iter 220 value 1054.613180  
## iter 230 value 1054.611248  
## iter 240 value 1054.609655  
## final value 1054.609604   
## converged  
## # weights: 120  
## initial value 2637.313712   
## iter 10 value 1724.716375  
## iter 20 value 1153.639720  
## iter 30 value 1109.731899  
## iter 40 value 1095.774913  
## iter 50 value 1093.918705  
## iter 60 value 1090.310145  
## iter 70 value 1089.519678  
## iter 80 value 1089.108324  
## iter 90 value 1089.012701  
## iter 100 value 1088.892864  
## iter 110 value 1088.787323  
## iter 120 value 1088.706074  
## iter 130 value 1088.671920  
## iter 140 value 1088.649673  
## iter 150 value 1088.638275  
## iter 160 value 1088.626756  
## iter 170 value 1088.601709  
## iter 180 value 1088.570711  
## iter 190 value 1088.522154  
## iter 200 value 1088.498858  
## iter 210 value 1088.486597  
## iter 220 value 1088.477483  
## iter 230 value 1088.472536  
## iter 240 value 1088.471539  
## iter 250 value 1088.470798  
## iter 250 value 1088.470794  
## iter 250 value 1088.470794  
## final value 1088.470794   
## converged  
## # weights: 120  
## initial value 3341.526088   
## iter 10 value 1318.285391  
## iter 20 value 1169.371899  
## iter 30 value 1133.135505  
## iter 40 value 1119.438531  
## iter 50 value 1115.789269  
## iter 60 value 1115.170979  
## iter 70 value 1114.829472  
## iter 80 value 1114.580303  
## iter 90 value 1114.372040  
## iter 100 value 1114.125392  
## iter 110 value 1113.967283  
## iter 120 value 1113.838184  
## iter 130 value 1113.758872  
## iter 140 value 1113.670543  
## iter 150 value 1113.544674  
## iter 160 value 1113.408337  
## iter 170 value 1113.343041  
## iter 180 value 1113.305064  
## iter 190 value 1113.299528  
## iter 200 value 1113.297641  
## iter 210 value 1113.293995  
## iter 220 value 1113.292154  
## iter 230 value 1113.286146  
## iter 240 value 1113.285178  
## iter 240 value 1113.285169  
## iter 240 value 1113.285169  
## final value 1113.285169   
## converged  
## # weights: 120  
## initial value 1696.472136   
## iter 10 value 1135.238177  
## iter 20 value 1072.672183  
## iter 30 value 1032.341127  
## iter 40 value 1004.690069  
## iter 50 value 999.912691  
## iter 60 value 997.571702  
## iter 70 value 994.872746  
## iter 80 value 992.916262  
## iter 90 value 991.927808  
## iter 100 value 990.616093  
## iter 110 value 989.627036  
## iter 120 value 988.743738  
## iter 130 value 988.107782  
## iter 140 value 987.340016  
## iter 150 value 986.852885  
## iter 160 value 986.309386  
## iter 170 value 986.007106  
## iter 180 value 985.725768  
## iter 190 value 985.399570  
## iter 200 value 985.014805  
## iter 210 value 984.764301  
## iter 220 value 984.287066  
## iter 230 value 983.610742  
## iter 240 value 983.047359  
## iter 250 value 982.854911  
## iter 260 value 982.718009  
## iter 270 value 982.444181  
## iter 280 value 982.226475  
## iter 290 value 982.134477  
## iter 300 value 982.014717  
## iter 310 value 981.928830  
## iter 320 value 981.908384  
## iter 330 value 981.895565  
## iter 340 value 981.881910  
## iter 350 value 981.849706  
## iter 360 value 981.806969  
## iter 370 value 981.762400  
## iter 380 value 981.742921  
## iter 390 value 981.688156  
## iter 400 value 981.565853  
## iter 410 value 981.495805  
## iter 420 value 981.460426  
## iter 430 value 981.444131  
## iter 440 value 981.427920  
## iter 450 value 981.394549  
## iter 460 value 981.350143  
## iter 470 value 981.307188  
## iter 480 value 981.178698  
## iter 490 value 981.156564  
## iter 500 value 981.144737  
## iter 510 value 981.130651  
## iter 520 value 981.122775  
## iter 530 value 981.088320  
## iter 540 value 981.062171  
## iter 550 value 981.036860  
## iter 560 value 980.994409  
## iter 570 value 980.971849  
## iter 580 value 980.950304  
## iter 590 value 980.933023  
## iter 600 value 980.923932  
## iter 610 value 980.918712  
## iter 620 value 980.911007  
## iter 630 value 980.901774  
## iter 640 value 980.898934  
## iter 650 value 980.895646  
## iter 660 value 980.892500  
## iter 670 value 980.887756  
## iter 680 value 980.875791  
## iter 690 value 980.867592  
## iter 700 value 980.853481  
## iter 710 value 980.821981  
## iter 720 value 980.806991  
## final value 980.799262   
## converged  
## # weights: 120  
## initial value 2238.646220   
## iter 10 value 1559.255721  
## iter 20 value 1137.639784  
## iter 30 value 1083.190818  
## iter 40 value 1045.697360  
## iter 50 value 1038.973134  
## iter 60 value 1034.818091  
## iter 70 value 1033.076833  
## iter 80 value 1032.348763  
## iter 90 value 1031.861344  
## iter 100 value 1031.684487  
## iter 110 value 1031.624119  
## iter 120 value 1031.528995  
## iter 130 value 1031.385302  
## iter 140 value 1031.260763  
## iter 150 value 1031.181721  
## iter 160 value 1031.152231  
## iter 170 value 1031.107513  
## iter 180 value 1031.054045  
## iter 190 value 1030.994069  
## iter 200 value 1030.932118  
## iter 210 value 1030.913695  
## iter 220 value 1030.900029  
## iter 230 value 1030.891237  
## iter 240 value 1030.879732  
## iter 250 value 1030.822780  
## iter 260 value 1030.760497  
## iter 270 value 1030.631608  
## iter 280 value 1030.570927  
## iter 290 value 1030.481524  
## iter 300 value 1030.393580  
## iter 310 value 1030.386267  
## iter 320 value 1030.382191  
## iter 330 value 1030.371615  
## iter 340 value 1030.369310  
## iter 350 value 1030.369137  
## final value 1030.368850   
## converged  
## # weights: 120  
## initial value 1625.313873   
## iter 10 value 1206.230357  
## iter 20 value 1106.987917  
## iter 30 value 1070.261387  
## iter 40 value 1063.293638  
## iter 50 value 1060.278912  
## iter 60 value 1058.033024  
## iter 70 value 1056.741498  
## iter 80 value 1056.393047  
## iter 90 value 1055.954491  
## iter 100 value 1055.585578  
## iter 110 value 1055.161108  
## iter 120 value 1054.859469  
## iter 130 value 1054.758553  
## iter 140 value 1054.719684  
## iter 150 value 1054.667340  
## iter 160 value 1054.642952  
## iter 170 value 1054.634243  
## iter 180 value 1054.630296  
## iter 190 value 1054.629599  
## iter 200 value 1054.628484  
## iter 210 value 1054.627263  
## iter 220 value 1054.622818  
## iter 230 value 1054.621644  
## iter 240 value 1054.621137  
## iter 250 value 1054.619477  
## iter 260 value 1054.615777  
## final value 1054.614846   
## converged  
## # weights: 120  
## initial value 1971.124790   
## iter 10 value 1426.188145  
## iter 20 value 1263.105593  
## iter 30 value 1125.382747  
## iter 40 value 1097.598981  
## iter 50 value 1090.513846  
## iter 60 value 1089.344803  
## iter 70 value 1089.002351  
## iter 80 value 1088.801174  
## iter 90 value 1088.729720  
## iter 100 value 1088.695897  
## iter 110 value 1088.680945  
## iter 120 value 1088.659655  
## iter 130 value 1088.643840  
## iter 140 value 1088.625155  
## iter 150 value 1088.597791  
## iter 160 value 1088.566439  
## iter 170 value 1088.556614  
## iter 180 value 1088.553584  
## iter 190 value 1088.550677  
## final value 1088.550622   
## converged  
## # weights: 120  
## initial value 2066.005299   
## iter 10 value 1377.703712  
## iter 20 value 1170.838387  
## iter 30 value 1142.489255  
## iter 40 value 1121.478536  
## iter 50 value 1116.350165  
## iter 60 value 1114.829007  
## iter 70 value 1113.677433  
## iter 80 value 1113.457813  
## iter 90 value 1113.396923  
## iter 100 value 1113.347577  
## iter 110 value 1113.319500  
## iter 120 value 1113.306433  
## iter 130 value 1113.298399  
## iter 140 value 1113.297393  
## iter 140 value 1113.297384  
## iter 140 value 1113.297384  
## final value 1113.297384   
## converged  
## # weights: 120  
## initial value 2070.528242   
## final value 1912.000000   
## converged  
## # weights: 120  
## initial value 4027.925736   
## iter 10 value 1719.906357  
## iter 20 value 1161.752604  
## iter 30 value 1065.576838  
## iter 40 value 1045.057458  
## iter 50 value 1039.238589  
## iter 60 value 1037.451392  
## iter 70 value 1036.055633  
## iter 80 value 1034.840997  
## iter 90 value 1033.176405  
## iter 100 value 1032.362932  
## iter 110 value 1031.907444  
## iter 120 value 1031.174884  
## iter 130 value 1030.482520  
## iter 140 value 1030.141026  
## iter 150 value 1029.997470  
## iter 160 value 1029.951566  
## iter 170 value 1029.929827  
## iter 180 value 1029.900629  
## iter 190 value 1029.868010  
## iter 200 value 1029.843663  
## iter 210 value 1029.833947  
## iter 220 value 1029.830071  
## iter 230 value 1029.827759  
## iter 240 value 1029.827123  
## iter 250 value 1029.824388  
## iter 260 value 1029.821642  
## iter 270 value 1029.812661  
## iter 280 value 1029.810275  
## final value 1029.809888   
## converged  
## # weights: 120  
## initial value 3929.235253   
## iter 10 value 1642.452010  
## iter 20 value 1265.878366  
## iter 30 value 1145.829456  
## iter 40 value 1071.452252  
## iter 50 value 1060.122264  
## iter 60 value 1056.914658  
## iter 70 value 1056.448122  
## iter 80 value 1055.967341  
## iter 90 value 1055.207968  
## iter 100 value 1054.941771  
## iter 110 value 1054.821982  
## iter 120 value 1054.760442  
## iter 130 value 1054.720654  
## iter 140 value 1054.704949  
## iter 150 value 1054.684235  
## iter 160 value 1054.665382  
## iter 170 value 1054.651443  
## iter 180 value 1054.631143  
## iter 190 value 1054.623321  
## iter 200 value 1054.615040  
## iter 210 value 1054.607917  
## iter 220 value 1054.603873  
## iter 230 value 1054.598625  
## iter 240 value 1054.591243  
## iter 250 value 1054.576814  
## iter 260 value 1054.565056  
## iter 270 value 1054.552456  
## iter 280 value 1054.550124  
## final value 1054.549412   
## converged  
## # weights: 120  
## initial value 1689.666440   
## iter 10 value 1142.372025  
## iter 20 value 1114.306783  
## iter 30 value 1092.112969  
## iter 40 value 1089.288382  
## iter 50 value 1088.985082  
## iter 60 value 1088.761751  
## iter 70 value 1088.719222  
## iter 80 value 1088.705719  
## iter 90 value 1088.686904  
## iter 100 value 1088.663003  
## iter 110 value 1088.657409  
## iter 120 value 1088.651568  
## iter 130 value 1088.641140  
## iter 140 value 1088.635109  
## iter 150 value 1088.634536  
## iter 160 value 1088.632593  
## final value 1088.632472   
## converged  
## # weights: 120  
## initial value 1806.587383   
## iter 10 value 1176.801905  
## iter 20 value 1141.866832  
## iter 30 value 1128.464955  
## iter 40 value 1125.373422  
## iter 50 value 1124.549220  
## iter 60 value 1123.740755  
## iter 70 value 1121.104172  
## iter 80 value 1119.109770  
## iter 90 value 1117.197246  
## iter 100 value 1116.133690  
## iter 110 value 1115.684041  
## iter 120 value 1115.369880  
## iter 130 value 1115.052596  
## iter 140 value 1114.632920  
## iter 150 value 1114.364645  
## iter 160 value 1114.084362  
## iter 170 value 1113.881382  
## iter 180 value 1113.702543  
## iter 190 value 1113.561442  
## iter 200 value 1113.439555  
## iter 210 value 1113.392429  
## iter 220 value 1113.370660  
## iter 230 value 1113.360260  
## iter 240 value 1113.357460  
## iter 250 value 1113.342440  
## iter 260 value 1113.330107  
## iter 270 value 1113.323011  
## final value 1113.322410   
## converged  
## # weights: 137  
## initial value 1486.675825   
## iter 10 value 1133.211218  
## iter 20 value 1060.121109  
## iter 30 value 1013.478696  
## iter 40 value 1004.519456  
## iter 50 value 996.234160  
## iter 60 value 992.588825  
## iter 70 value 989.088278  
## iter 80 value 985.059190  
## iter 90 value 981.773040  
## iter 100 value 980.160802  
## iter 110 value 978.477583  
## iter 120 value 977.282624  
## iter 130 value 976.164258  
## iter 140 value 975.545467  
## iter 150 value 975.081193  
## iter 160 value 974.530232  
## iter 170 value 973.530473  
## iter 180 value 972.584208  
## iter 190 value 971.927074  
## iter 200 value 971.625189  
## iter 210 value 971.408208  
## iter 220 value 971.002575  
## iter 230 value 970.731218  
## iter 240 value 970.418091  
## iter 250 value 969.628333  
## iter 260 value 968.971373  
## iter 270 value 968.582508  
## iter 280 value 968.192950  
## iter 290 value 968.128833  
## iter 300 value 968.017074  
## iter 310 value 967.957012  
## iter 320 value 967.847401  
## iter 330 value 967.725801  
## iter 340 value 967.674666  
## iter 350 value 967.663429  
## iter 360 value 967.655770  
## iter 370 value 967.642773  
## iter 380 value 967.633327  
## iter 390 value 967.616705  
## iter 400 value 967.602581  
## iter 410 value 967.593588  
## iter 420 value 967.591332  
## iter 430 value 967.588934  
## iter 440 value 967.587154  
## iter 450 value 967.586499  
## iter 460 value 967.584427  
## iter 470 value 967.582324  
## iter 480 value 967.577132  
## iter 490 value 967.568937  
## iter 500 value 967.552348  
## final value 967.552348   
## stopped after 500 iterations  
## # weights: 137  
## initial value 4291.650470   
## iter 10 value 1962.382842  
## iter 20 value 1197.026648  
## iter 30 value 1084.503571  
## iter 40 value 1054.857541  
## iter 50 value 1041.689049  
## iter 60 value 1035.912907  
## iter 70 value 1032.924361  
## iter 80 value 1031.961093  
## iter 90 value 1031.717219  
## iter 100 value 1031.625120  
## iter 110 value 1031.564870  
## iter 120 value 1031.338092  
## iter 130 value 1031.041295  
## iter 140 value 1030.850715  
## iter 150 value 1030.800938  
## iter 160 value 1030.757236  
## iter 170 value 1030.736693  
## iter 180 value 1030.714972  
## iter 190 value 1030.702417  
## iter 200 value 1030.692549  
## iter 210 value 1030.688558  
## iter 220 value 1030.685792  
## iter 230 value 1030.682728  
## iter 240 value 1030.676252  
## iter 250 value 1030.672538  
## iter 260 value 1030.661917  
## iter 270 value 1030.651390  
## iter 280 value 1030.631040  
## iter 290 value 1030.578500  
## iter 300 value 1030.553466  
## iter 310 value 1030.536427  
## iter 320 value 1030.511985  
## iter 330 value 1030.486180  
## iter 340 value 1030.477401  
## iter 350 value 1030.476451  
## final value 1030.476429   
## converged  
## # weights: 137  
## initial value 3263.809455   
## iter 10 value 1533.451951  
## iter 20 value 1171.637747  
## iter 30 value 1105.123253  
## iter 40 value 1072.737618  
## iter 50 value 1063.346443  
## iter 60 value 1058.367457  
## iter 70 value 1057.267159  
## iter 80 value 1056.557329  
## iter 90 value 1056.105729  
## iter 100 value 1055.780667  
## iter 110 value 1055.213974  
## iter 120 value 1054.705650  
## iter 130 value 1054.579695  
## iter 140 value 1054.546545  
## iter 150 value 1054.535541  
## iter 160 value 1054.528666  
## iter 170 value 1054.526345  
## iter 180 value 1054.524937  
## iter 190 value 1054.523835  
## iter 200 value 1054.523498  
## iter 210 value 1054.523118  
## iter 220 value 1054.522345  
## iter 230 value 1054.521092  
## final value 1054.520798   
## converged  
## # weights: 137  
## initial value 1458.533828   
## iter 10 value 1175.368462  
## iter 20 value 1112.984664  
## iter 30 value 1097.076873  
## iter 40 value 1091.270230  
## iter 50 value 1090.033761  
## iter 60 value 1089.720710  
## iter 70 value 1089.422349  
## iter 80 value 1089.284793  
## iter 90 value 1089.101699  
## iter 100 value 1089.020810  
## iter 110 value 1088.880350  
## iter 120 value 1088.769698  
## iter 130 value 1088.694173  
## iter 140 value 1088.675934  
## iter 150 value 1088.665771  
## iter 160 value 1088.652576  
## iter 170 value 1088.629192  
## iter 180 value 1088.615797  
## iter 190 value 1088.606082  
## iter 200 value 1088.597783  
## iter 210 value 1088.590421  
## iter 220 value 1088.589284  
## iter 230 value 1088.587881  
## iter 240 value 1088.586625  
## iter 250 value 1088.585641  
## iter 260 value 1088.584866  
## iter 270 value 1088.580460  
## final value 1088.580357   
## converged  
## # weights: 137  
## initial value 3104.283652   
## iter 10 value 1377.630845  
## iter 20 value 1218.049659  
## iter 30 value 1141.927868  
## iter 40 value 1127.195331  
## iter 50 value 1121.894240  
## iter 60 value 1119.720287  
## iter 70 value 1118.901775  
## iter 80 value 1116.732778  
## iter 90 value 1115.575871  
## iter 100 value 1114.776715  
## iter 110 value 1114.185771  
## iter 120 value 1113.926715  
## iter 130 value 1113.741161  
## iter 140 value 1113.622810  
## iter 150 value 1113.509961  
## iter 160 value 1113.414942  
## iter 170 value 1113.367034  
## iter 180 value 1113.307231  
## iter 190 value 1113.254926  
## iter 200 value 1113.222643  
## iter 210 value 1113.185297  
## iter 220 value 1113.169238  
## iter 230 value 1113.164990  
## iter 240 value 1113.160001  
## iter 250 value 1113.156371  
## iter 260 value 1113.154081  
## iter 270 value 1113.153300  
## final value 1113.152403   
## converged  
## # weights: 137  
## initial value 2989.286860   
## final value 1912.000000   
## converged  
## # weights: 137  
## initial value 1527.362149   
## iter 10 value 1158.799503  
## iter 20 value 1081.957497  
## iter 30 value 1053.255156  
## iter 40 value 1044.800204  
## iter 50 value 1040.324715  
## iter 60 value 1036.147893  
## iter 70 value 1034.433445  
## iter 80 value 1033.268503  
## iter 90 value 1032.847097  
## iter 100 value 1032.469453  
## iter 110 value 1032.237579  
## iter 120 value 1032.027452  
## iter 130 value 1031.857442  
## iter 140 value 1031.701101  
## iter 150 value 1031.431945  
## iter 160 value 1031.067156  
## iter 170 value 1030.890118  
## iter 180 value 1030.778954  
## iter 190 value 1030.733789  
## iter 200 value 1030.692391  
## iter 210 value 1030.674909  
## iter 220 value 1030.656442  
## iter 230 value 1030.644045  
## iter 240 value 1030.620002  
## iter 250 value 1030.597004  
## iter 260 value 1030.541628  
## iter 270 value 1030.458394  
## iter 280 value 1030.383545  
## iter 290 value 1030.280067  
## iter 300 value 1030.211168  
## iter 310 value 1030.173784  
## iter 320 value 1030.069640  
## iter 330 value 1029.975041  
## iter 340 value 1029.937140  
## iter 350 value 1029.913015  
## iter 360 value 1029.880746  
## iter 370 value 1029.857545  
## iter 380 value 1029.851935  
## iter 390 value 1029.847402  
## iter 400 value 1029.842292  
## iter 410 value 1029.840256  
## iter 420 value 1029.837431  
## iter 430 value 1029.833814  
## iter 440 value 1029.832915  
## iter 450 value 1029.830463  
## iter 460 value 1029.827529  
## iter 470 value 1029.825382  
## iter 480 value 1029.824074  
## iter 490 value 1029.823034  
## iter 500 value 1029.822463  
## final value 1029.821949   
## converged  
## # weights: 137  
## initial value 2428.542152   
## iter 10 value 1543.658702  
## iter 20 value 1158.438787  
## iter 30 value 1090.240224  
## iter 40 value 1065.424822  
## iter 50 value 1060.164864  
## iter 60 value 1058.632010  
## iter 70 value 1057.171411  
## iter 80 value 1056.286828  
## iter 90 value 1055.429056  
## iter 100 value 1055.018337  
## iter 110 value 1054.800443  
## iter 120 value 1054.602894  
## iter 130 value 1054.564823  
## iter 140 value 1054.547539  
## iter 150 value 1054.535514  
## iter 160 value 1054.528576  
## iter 170 value 1054.527573  
## iter 180 value 1054.527375  
## iter 190 value 1054.526647  
## iter 200 value 1054.525459  
## iter 210 value 1054.524968  
## iter 220 value 1054.524604  
## iter 230 value 1054.524282  
## iter 240 value 1054.523851  
## final value 1054.523601   
## converged  
## # weights: 137  
## initial value 1582.803137   
## iter 10 value 1182.770498  
## iter 20 value 1126.376336  
## iter 30 value 1097.959959  
## iter 40 value 1090.651472  
## iter 50 value 1089.491723  
## iter 60 value 1089.062599  
## iter 70 value 1088.764402  
## iter 80 value 1088.686326  
## iter 90 value 1088.597262  
## iter 100 value 1088.537649  
## iter 110 value 1088.487775  
## iter 120 value 1088.462501  
## iter 130 value 1088.440441  
## iter 140 value 1088.406142  
## iter 150 value 1088.389567  
## iter 160 value 1088.376507  
## iter 170 value 1088.366931  
## iter 180 value 1088.363210  
## iter 190 value 1088.362188  
## final value 1088.362150   
## converged  
## # weights: 137  
## initial value 2141.506758   
## iter 10 value 1363.078935  
## iter 20 value 1165.444501  
## iter 30 value 1127.582811  
## iter 40 value 1117.900838  
## iter 50 value 1115.116829  
## iter 60 value 1114.341450  
## iter 70 value 1113.763098  
## iter 80 value 1113.513135  
## iter 90 value 1113.412677  
## iter 100 value 1113.310947  
## iter 110 value 1113.253808  
## iter 120 value 1113.233519  
## iter 130 value 1113.228472  
## iter 140 value 1113.224895  
## iter 150 value 1113.208324  
## iter 160 value 1113.182073  
## iter 170 value 1113.169514  
## iter 180 value 1113.162704  
## iter 190 value 1113.157569  
## iter 200 value 1113.155530  
## iter 210 value 1113.153564  
## iter 220 value 1113.152887  
## final value 1113.151926   
## converged  
## # weights: 137  
## initial value 1976.387631   
## final value 1912.000000   
## converged  
## # weights: 137  
## initial value 1753.303574   
## iter 10 value 1118.612432  
## iter 20 value 1070.229744  
## iter 30 value 1043.883410  
## iter 40 value 1034.430105  
## iter 50 value 1033.076872  
## iter 60 value 1032.299202  
## iter 70 value 1031.820271  
## iter 80 value 1031.436409  
## iter 90 value 1031.255997  
## iter 100 value 1031.176254  
## iter 110 value 1031.082873  
## iter 120 value 1031.017531  
## iter 130 value 1030.956652  
## iter 140 value 1030.913531  
## iter 150 value 1030.890947  
## iter 160 value 1030.880570  
## iter 170 value 1030.875175  
## iter 180 value 1030.871699  
## iter 190 value 1030.867290  
## iter 200 value 1030.862744  
## iter 210 value 1030.857966  
## iter 220 value 1030.855739  
## iter 230 value 1030.852635  
## iter 240 value 1030.850718  
## iter 250 value 1030.848608  
## iter 260 value 1030.846313  
## iter 270 value 1030.844071  
## final value 1030.843804   
## converged  
## # weights: 137  
## initial value 1477.804052   
## iter 10 value 1154.714221  
## iter 20 value 1095.444605  
## iter 30 value 1065.945613  
## iter 40 value 1058.821710  
## iter 50 value 1057.401429  
## iter 60 value 1056.790834  
## iter 70 value 1056.561612  
## iter 80 value 1056.439843  
## iter 90 value 1056.311204  
## iter 100 value 1056.156379  
## iter 110 value 1056.042800  
## iter 120 value 1055.834748  
## iter 130 value 1055.729419  
## iter 140 value 1055.638644  
## iter 150 value 1055.518880  
## iter 160 value 1055.334474  
## iter 170 value 1055.126852  
## iter 180 value 1055.004205  
## iter 190 value 1054.919630  
## iter 200 value 1054.854866  
## iter 210 value 1054.791879  
## iter 220 value 1054.760061  
## iter 230 value 1054.736608  
## iter 240 value 1054.732035  
## iter 250 value 1054.724627  
## iter 260 value 1054.715922  
## iter 270 value 1054.704132  
## iter 280 value 1054.695891  
## iter 290 value 1054.686412  
## iter 300 value 1054.681307  
## iter 310 value 1054.679219  
## final value 1054.679163   
## converged  
## # weights: 137  
## initial value 2956.964552   
## iter 10 value 1926.786946  
## iter 20 value 1193.273131  
## iter 30 value 1120.023695  
## iter 40 value 1096.496100  
## iter 50 value 1092.868971  
## iter 60 value 1091.204167  
## iter 70 value 1089.972556  
## iter 80 value 1089.276141  
## iter 90 value 1088.853998  
## iter 100 value 1088.759647  
## iter 110 value 1088.731648  
## iter 120 value 1088.716196  
## iter 130 value 1088.659116  
## iter 140 value 1088.593420  
## iter 150 value 1088.532050  
## iter 160 value 1088.473246  
## iter 170 value 1088.452689  
## iter 180 value 1088.427528  
## iter 190 value 1088.411080  
## iter 200 value 1088.395103  
## iter 210 value 1088.386965  
## iter 220 value 1088.372812  
## iter 230 value 1088.370711  
## iter 240 value 1088.368595  
## iter 250 value 1088.366969  
## iter 260 value 1088.366609  
## iter 270 value 1088.364866  
## iter 280 value 1088.359680  
## final value 1088.359366   
## converged  
## # weights: 137  
## initial value 1679.122869   
## iter 10 value 1169.787987  
## iter 20 value 1135.246317  
## iter 30 value 1122.748996  
## iter 40 value 1118.496156  
## iter 50 value 1116.477852  
## iter 60 value 1115.433643  
## iter 70 value 1114.523073  
## iter 80 value 1114.140715  
## iter 90 value 1113.929651  
## iter 100 value 1113.751029  
## iter 110 value 1113.467806  
## iter 120 value 1113.305453  
## iter 130 value 1113.204783  
## iter 140 value 1113.165086  
## iter 150 value 1113.141394  
## iter 160 value 1113.126740  
## iter 170 value 1113.120832  
## iter 180 value 1113.113433  
## iter 190 value 1113.101113  
## iter 200 value 1113.094696  
## iter 210 value 1113.092274  
## iter 220 value 1113.091358  
## iter 230 value 1113.089928  
## iter 240 value 1113.089505  
## iter 250 value 1113.087592  
## iter 260 value 1113.084439  
## iter 270 value 1113.081963  
## iter 280 value 1113.079823  
## final value 1113.079734   
## converged  
## # weights: 137  
## initial value 3068.368302   
## final value 1912.000000   
## converged  
## # weights: 137  
## initial value 1858.677347   
## iter 10 value 1101.669509  
## iter 20 value 1069.795412  
## iter 30 value 1042.239915  
## iter 40 value 1035.028234  
## iter 50 value 1032.957150  
## iter 60 value 1031.909594  
## iter 70 value 1031.436607  
## iter 80 value 1031.081500  
## iter 90 value 1030.828597  
## iter 100 value 1030.631169  
## iter 110 value 1030.500852  
## iter 120 value 1030.432682  
## iter 130 value 1030.383852  
## iter 140 value 1030.324383  
## iter 150 value 1030.286555  
## iter 160 value 1030.188386  
## iter 170 value 1029.990834  
## iter 180 value 1029.916416  
## iter 190 value 1029.889633  
## iter 200 value 1029.880517  
## iter 210 value 1029.876521  
## iter 220 value 1029.873961  
## iter 230 value 1029.871513  
## iter 240 value 1029.870839  
## iter 250 value 1029.869027  
## iter 260 value 1029.867945  
## iter 270 value 1029.865366  
## final value 1029.864359   
## converged  
## # weights: 137  
## initial value 1503.012553   
## iter 10 value 1140.247181  
## iter 20 value 1097.371516  
## iter 30 value 1068.855826  
## iter 40 value 1059.647717  
## iter 50 value 1057.492580  
## iter 60 value 1056.830361  
## iter 70 value 1056.389768  
## iter 80 value 1056.132008  
## iter 90 value 1056.015021  
## iter 100 value 1055.948620  
## iter 110 value 1055.907033  
## final value 1055.840829   
## converged  
## # weights: 137  
## initial value 2416.874744   
## iter 10 value 1502.643749  
## iter 20 value 1141.410065  
## iter 30 value 1099.402587  
## iter 40 value 1092.053912  
## iter 50 value 1089.620296  
## iter 60 value 1089.015405  
## iter 70 value 1088.677087  
## iter 80 value 1088.574230  
## iter 90 value 1088.555213  
## iter 100 value 1088.540553  
## iter 110 value 1088.528411  
## iter 120 value 1088.477349  
## iter 130 value 1088.404209  
## iter 140 value 1088.380246  
## iter 150 value 1088.376728  
## iter 160 value 1088.372637  
## iter 170 value 1088.371327  
## iter 180 value 1088.369258  
## iter 190 value 1088.366670  
## final value 1088.366525   
## converged  
## # weights: 137  
## initial value 1985.671547   
## iter 10 value 1434.922155  
## iter 20 value 1231.749464  
## iter 30 value 1138.092207  
## iter 40 value 1120.909333  
## iter 50 value 1116.855780  
## iter 60 value 1114.487421  
## iter 70 value 1113.866944  
## iter 80 value 1113.568129  
## iter 90 value 1113.451318  
## iter 100 value 1113.392645  
## iter 110 value 1113.334045  
## iter 120 value 1113.280794  
## iter 130 value 1113.247322  
## iter 140 value 1113.220668  
## iter 150 value 1113.210403  
## iter 160 value 1113.201189  
## iter 170 value 1113.179185  
## iter 180 value 1113.172453  
## iter 190 value 1113.171538  
## iter 200 value 1113.169859  
## iter 210 value 1113.160820  
## iter 220 value 1113.154500  
## iter 230 value 1113.152935  
## final value 1113.152430   
## converged  
## # weights: 137  
## initial value 1745.643543   
## iter 10 value 1127.548035  
## iter 20 value 1071.796525  
## iter 30 value 1020.541402  
## iter 40 value 1006.454229  
## iter 50 value 991.640531  
## iter 60 value 987.445452  
## iter 70 value 985.675560  
## iter 80 value 984.475872  
## iter 90 value 983.435988  
## iter 100 value 981.678176  
## iter 110 value 980.455431  
## iter 120 value 980.136698  
## iter 130 value 979.850748  
## iter 140 value 979.604929  
## iter 150 value 979.034076  
## iter 160 value 978.393196  
## iter 170 value 976.833498  
## iter 180 value 976.042163  
## iter 190 value 975.546421  
## iter 200 value 974.931091  
## iter 210 value 974.286289  
## iter 220 value 973.773924  
## iter 230 value 973.333639  
## iter 240 value 973.144789  
## iter 250 value 972.811696  
## iter 260 value 972.229573  
## iter 270 value 971.627965  
## iter 280 value 971.243424  
## iter 290 value 971.146088  
## iter 300 value 971.075725  
## iter 310 value 970.999438  
## iter 320 value 970.959520  
## iter 330 value 970.924999  
## iter 340 value 970.869910  
## iter 350 value 970.756312  
## iter 360 value 970.701928  
## iter 370 value 970.664255  
## iter 380 value 970.644778  
## iter 390 value 970.635982  
## iter 400 value 970.629415  
## iter 410 value 970.621782  
## iter 420 value 970.616012  
## iter 430 value 970.604450  
## iter 440 value 970.589003  
## iter 450 value 970.580833  
## iter 460 value 970.569229  
## iter 470 value 970.557359  
## iter 480 value 970.551704  
## iter 490 value 970.542986  
## iter 500 value 970.537058  
## iter 510 value 970.515837  
## iter 520 value 970.463976  
## iter 530 value 970.450171  
## iter 540 value 970.384558  
## iter 550 value 970.357674  
## iter 560 value 970.310554  
## iter 570 value 970.243567  
## iter 580 value 970.223549  
## iter 590 value 970.218687  
## iter 600 value 970.215547  
## iter 610 value 970.211724  
## iter 620 value 970.200460  
## iter 630 value 970.192313  
## iter 640 value 970.183684  
## iter 650 value 970.175999  
## iter 660 value 970.146953  
## iter 670 value 970.124098  
## iter 680 value 970.101579  
## iter 690 value 970.084747  
## iter 700 value 970.050654  
## iter 710 value 970.016596  
## iter 720 value 969.965197  
## iter 730 value 969.943862  
## iter 740 value 969.920959  
## iter 750 value 969.886339  
## iter 760 value 969.864943  
## iter 770 value 969.848015  
## iter 780 value 969.838252  
## iter 790 value 969.822335  
## iter 800 value 969.811684  
## final value 969.811684   
## stopped after 800 iterations  
## # weights: 137  
## initial value 1599.696022   
## iter 10 value 1145.935779  
## iter 20 value 1098.558181  
## iter 30 value 1049.634998  
## iter 40 value 1035.278796  
## iter 50 value 1032.423439  
## iter 60 value 1031.590391  
## iter 70 value 1031.357214  
## iter 80 value 1031.070192  
## iter 90 value 1030.798276  
## iter 100 value 1030.643093  
## iter 110 value 1030.602439  
## iter 120 value 1030.581665  
## iter 130 value 1030.554955  
## iter 140 value 1030.544796  
## iter 150 value 1030.536782  
## iter 160 value 1030.528930  
## final value 1030.525818   
## converged  
## # weights: 137  
## initial value 1816.184118   
## iter 10 value 1123.152992  
## iter 20 value 1087.508563  
## iter 30 value 1065.245052  
## iter 40 value 1061.832110  
## iter 50 value 1060.992023  
## iter 60 value 1060.313264  
## iter 70 value 1059.539577  
## iter 80 value 1058.964237  
## iter 90 value 1058.512193  
## iter 100 value 1058.111566  
## iter 110 value 1057.722881  
## iter 120 value 1057.412919  
## iter 130 value 1057.199914  
## iter 140 value 1056.951033  
## iter 150 value 1056.780051  
## iter 160 value 1056.470270  
## iter 170 value 1056.276676  
## iter 180 value 1056.159662  
## iter 190 value 1055.978278  
## iter 200 value 1055.754345  
## iter 210 value 1055.624623  
## iter 220 value 1055.470639  
## iter 230 value 1055.353079  
## iter 240 value 1055.182752  
## iter 250 value 1055.057666  
## iter 260 value 1054.972783  
## iter 270 value 1054.888357  
## iter 280 value 1054.860645  
## iter 290 value 1054.820807  
## iter 300 value 1054.802132  
## iter 310 value 1054.778988  
## iter 320 value 1054.766863  
## iter 330 value 1054.764974  
## final value 1054.764130   
## converged  
## # weights: 137  
## initial value 1494.917267   
## iter 10 value 1176.274384  
## iter 20 value 1116.332646  
## iter 30 value 1096.342331  
## iter 40 value 1093.701209  
## iter 50 value 1092.230877  
## iter 60 value 1091.568450  
## iter 70 value 1090.871706  
## iter 80 value 1090.231583  
## iter 90 value 1089.943564  
## iter 100 value 1089.744159  
## iter 110 value 1089.623780  
## iter 120 value 1089.384168  
## iter 130 value 1089.153803  
## iter 140 value 1089.029636  
## iter 150 value 1088.968651  
## iter 160 value 1088.920717  
## iter 170 value 1088.824625  
## iter 180 value 1088.775180  
## iter 190 value 1088.716120  
## iter 200 value 1088.642405  
## iter 210 value 1088.606359  
## iter 220 value 1088.592317  
## iter 230 value 1088.583925  
## iter 240 value 1088.580422  
## iter 250 value 1088.579444  
## iter 260 value 1088.578590  
## iter 270 value 1088.576463  
## iter 280 value 1088.572019  
## iter 290 value 1088.568807  
## iter 300 value 1088.562816  
## final value 1088.562384   
## converged  
## # weights: 137  
## initial value 2275.197238   
## iter 10 value 1464.830532  
## iter 20 value 1242.598468  
## iter 30 value 1140.036769  
## iter 40 value 1119.215763  
## iter 50 value 1115.004657  
## iter 60 value 1113.957923  
## iter 70 value 1113.573517  
## iter 80 value 1113.375043  
## iter 90 value 1113.180074  
## iter 100 value 1113.113041  
## iter 110 value 1113.092499  
## iter 120 value 1113.083695  
## iter 130 value 1113.078706  
## iter 140 value 1113.076759  
## iter 150 value 1113.075729  
## iter 160 value 1113.075383  
## final value 1113.075308   
## converged  
## # weights: 137  
## initial value 2082.455137   
## final value 1912.000000   
## converged  
## # weights: 137  
## initial value 1626.694974   
## iter 10 value 1145.848619  
## iter 20 value 1079.550407  
## iter 30 value 1047.919948  
## iter 40 value 1037.798098  
## iter 50 value 1034.798192  
## iter 60 value 1034.073969  
## iter 70 value 1033.155851  
## iter 80 value 1032.389942  
## iter 90 value 1032.126070  
## iter 100 value 1031.961731  
## iter 110 value 1031.835382  
## iter 120 value 1031.716062  
## iter 130 value 1031.617760  
## iter 140 value 1031.467248  
## iter 150 value 1031.315224  
## iter 160 value 1031.136302  
## iter 170 value 1030.998422  
## iter 180 value 1030.848405  
## iter 190 value 1030.725859  
## iter 200 value 1030.666468  
## iter 210 value 1030.616872  
## iter 220 value 1030.569590  
## iter 230 value 1030.542563  
## iter 240 value 1030.531391  
## iter 250 value 1030.528344  
## iter 260 value 1030.521377  
## iter 270 value 1030.513176  
## iter 280 value 1030.505692  
## iter 290 value 1030.472880  
## iter 300 value 1030.427189  
## iter 310 value 1030.404782  
## iter 320 value 1030.395236  
## iter 330 value 1030.390846  
## iter 340 value 1030.390550  
## final value 1030.390518   
## converged  
## # weights: 137  
## initial value 1708.209074   
## iter 10 value 1123.806285  
## iter 20 value 1087.988652  
## iter 30 value 1063.178832  
## iter 40 value 1057.909834  
## iter 50 value 1057.254041  
## iter 60 value 1057.076685  
## iter 70 value 1056.888703  
## iter 80 value 1056.523003  
## iter 90 value 1056.430100  
## iter 100 value 1056.389284  
## iter 110 value 1056.351391  
## iter 120 value 1056.330647  
## iter 130 value 1056.320881  
## iter 140 value 1056.311921  
## iter 150 value 1056.306598  
## iter 160 value 1056.303700  
## iter 170 value 1056.302513  
## iter 180 value 1056.300234  
## iter 190 value 1056.296898  
## iter 200 value 1056.293145  
## iter 210 value 1056.287842  
## iter 220 value 1056.274805  
## iter 230 value 1056.239245  
## iter 240 value 1056.098129  
## iter 250 value 1055.841036  
## iter 260 value 1055.711059  
## iter 270 value 1055.660683  
## iter 280 value 1055.639844  
## iter 290 value 1055.609494  
## iter 300 value 1055.605398  
## iter 310 value 1055.600131  
## iter 320 value 1055.598624  
## final value 1055.598573   
## converged  
## # weights: 137  
## initial value 1829.338406   
## iter 10 value 1195.021933  
## iter 20 value 1124.712212  
## iter 30 value 1101.668387  
## iter 40 value 1095.001048  
## iter 50 value 1092.613683  
## iter 60 value 1091.300509  
## iter 70 value 1090.624312  
## iter 80 value 1090.307938  
## iter 90 value 1090.010341  
## iter 100 value 1089.738691  
## iter 110 value 1089.576668  
## iter 120 value 1089.438209  
## iter 130 value 1089.272235  
## iter 140 value 1089.107082  
## iter 150 value 1089.031729  
## iter 160 value 1088.972688  
## iter 170 value 1088.899587  
## iter 180 value 1088.839825  
## iter 190 value 1088.809776  
## iter 200 value 1088.788895  
## iter 210 value 1088.766358  
## iter 220 value 1088.744952  
## iter 230 value 1088.721948  
## iter 240 value 1088.700225  
## iter 250 value 1088.654468  
## iter 260 value 1088.637117  
## iter 270 value 1088.624434  
## iter 280 value 1088.601862  
## iter 290 value 1088.575244  
## iter 300 value 1088.562788  
## final value 1088.562470   
## converged  
## # weights: 137  
## initial value 1925.392628   
## iter 10 value 1456.305104  
## iter 20 value 1183.814828  
## iter 30 value 1132.196596  
## iter 40 value 1122.110195  
## iter 50 value 1118.877912  
## iter 60 value 1117.352331  
## iter 70 value 1116.362132  
## iter 80 value 1115.564857  
## iter 90 value 1114.645746  
## iter 100 value 1114.112404  
## iter 110 value 1113.987981  
## iter 120 value 1113.849752  
## iter 130 value 1113.637075  
## iter 140 value 1113.516629  
## iter 150 value 1113.451101  
## iter 160 value 1113.414933  
## iter 170 value 1113.360329  
## iter 180 value 1113.267975  
## iter 190 value 1113.203461  
## iter 200 value 1113.174006  
## iter 210 value 1113.148966  
## iter 220 value 1113.123831  
## iter 230 value 1113.107916  
## iter 240 value 1113.092206  
## iter 250 value 1113.081382  
## iter 260 value 1113.076270  
## iter 270 value 1113.075355  
## iter 280 value 1113.075144  
## final value 1113.075075   
## converged

myNewFrame

## node maxit decay misscls.train misscls.test  
## 1 5 500 0.0 0.189250 0.1820  
## 2 5 500 0.1 0.188500 0.1845  
## 3 5 500 0.2 0.187750 0.1845  
## 4 5 500 0.4 0.191375 0.1820  
## 5 5 500 0.6 0.192750 0.1820  
## 6 5 600 0.0 0.239000 0.2335  
## 7 5 600 0.1 0.188375 0.1845  
## 8 5 600 0.2 0.187750 0.1845  
## 9 5 600 0.4 0.190875 0.1820  
## 10 5 600 0.6 0.193250 0.1825  
## 11 5 700 0.0 0.239000 0.2335  
## 12 5 700 0.1 0.188125 0.1825  
## 13 5 700 0.2 0.189000 0.1845  
## 14 5 700 0.4 0.191125 0.1825  
## 15 5 700 0.6 0.192750 0.1820  
## 16 5 750 0.0 0.239000 0.2335  
## 17 5 750 0.1 0.188750 0.1830  
## 18 5 750 0.2 0.188250 0.1840  
## 19 5 750 0.4 0.191125 0.1825  
## 20 5 750 0.6 0.193250 0.1825  
## 21 5 800 0.0 0.186500 0.1795  
## 22 5 800 0.1 0.189250 0.1845  
## 23 5 800 0.2 0.189000 0.1845  
## 24 5 800 0.4 0.191125 0.1820  
## 25 5 800 0.6 0.192750 0.1820  
## 26 5 1000 0.0 0.239000 0.2335  
## 27 5 1000 0.1 0.188625 0.1870  
## 28 5 1000 0.2 0.188875 0.1835  
## 29 5 1000 0.4 0.191125 0.1820  
## 30 5 1000 0.6 0.193250 0.1825  
## 31 6 500 0.0 0.239000 0.2335  
## 32 6 500 0.1 0.188125 0.1825  
## 33 6 500 0.2 0.187750 0.1845  
## 34 6 500 0.4 0.191125 0.1820  
## 35 6 500 0.6 0.192500 0.1825  
## 36 6 600 0.0 0.189125 0.1855  
## 37 6 600 0.1 0.188500 0.1835  
## 38 6 600 0.2 0.187750 0.1845  
## 39 6 600 0.4 0.191250 0.1820  
## 40 6 600 0.6 0.193125 0.1825  
## 41 6 700 0.0 0.185375 0.1845  
## 42 6 700 0.1 0.188375 0.1825  
## 43 6 700 0.2 0.188500 0.1830  
## 44 6 700 0.4 0.191125 0.1825  
## 45 6 700 0.6 0.193125 0.1825  
## 46 6 750 0.0 0.239000 0.2335  
## 47 6 750 0.1 0.188500 0.1840  
## 48 6 750 0.2 0.188250 0.1845  
## 49 6 750 0.4 0.193125 0.1835  
## 50 6 750 0.6 0.193125 0.1825  
## 51 6 800 0.0 0.239000 0.2335  
## 52 6 800 0.1 0.188375 0.1825  
## 53 6 800 0.2 0.187750 0.1845  
## 54 6 800 0.4 0.191375 0.1825  
## 55 6 800 0.6 0.193000 0.1825  
## 56 6 1000 0.0 0.239000 0.2335  
## 57 6 1000 0.1 0.187875 0.1820  
## 58 6 1000 0.2 0.187750 0.1845  
## 59 6 1000 0.4 0.191375 0.1825  
## 60 6 1000 0.6 0.192500 0.1825  
## 61 7 500 0.0 0.239000 0.2335  
## 62 7 500 0.1 0.188250 0.1825  
## 63 7 500 0.2 0.188500 0.1830  
## 64 7 500 0.4 0.191000 0.1815  
## 65 7 500 0.6 0.192625 0.1825  
## 66 7 600 0.0 0.239000 0.2335  
## 67 7 600 0.1 0.187875 0.1830  
## 68 7 600 0.2 0.188000 0.1845  
## 69 7 600 0.4 0.191500 0.1820  
## 70 7 600 0.6 0.192500 0.1825  
## 71 7 700 0.0 0.239000 0.2335  
## 72 7 700 0.1 0.187875 0.1835  
## 73 7 700 0.2 0.188875 0.1825  
## 74 7 700 0.4 0.191625 0.1820  
## 75 7 700 0.6 0.192750 0.1825  
## 76 7 750 0.0 0.184375 0.1880  
## 77 7 750 0.1 0.188375 0.1835  
## 78 7 750 0.2 0.188500 0.1830  
## 79 7 750 0.4 0.191625 0.1820  
## 80 7 750 0.6 0.192625 0.1825  
## 81 7 800 0.0 0.182875 0.1860  
## 82 7 800 0.1 0.188750 0.1825  
## 83 7 800 0.2 0.188500 0.1830  
## 84 7 800 0.4 0.191375 0.1825  
## 85 7 800 0.6 0.193125 0.1825  
## 86 7 1000 0.0 0.239000 0.2335  
## 87 7 1000 0.1 0.188250 0.1830  
## 88 7 1000 0.2 0.188125 0.1845  
## 89 7 1000 0.4 0.191375 0.1820  
## 90 7 1000 0.6 0.193500 0.1825  
## 91 8 500 0.0 0.180750 0.1955  
## 92 8 500 0.1 0.188375 0.1825  
## 93 8 500 0.2 0.188125 0.1845  
## 94 8 500 0.4 0.191875 0.1820  
## 95 8 500 0.6 0.192500 0.1820  
## 96 8 600 0.0 0.239000 0.2335  
## 97 8 600 0.1 0.187875 0.1835  
## 98 8 600 0.2 0.188125 0.1845  
## 99 8 600 0.4 0.191625 0.1815  
## 100 8 600 0.6 0.192500 0.1820  
## 101 8 700 0.0 0.239000 0.2335  
## 102 8 700 0.1 0.189000 0.1820  
## 103 8 700 0.2 0.188750 0.1830  
## 104 8 700 0.4 0.191500 0.1820  
## 105 8 700 0.6 0.193250 0.1820  
## 106 8 750 0.0 0.239000 0.2335  
## 107 8 750 0.1 0.188250 0.1830  
## 108 8 750 0.2 0.189125 0.1815  
## 109 8 750 0.4 0.191625 0.1815  
## 110 8 750 0.6 0.192500 0.1820  
## 111 8 800 0.0 0.180250 0.1880  
## 112 8 800 0.1 0.188250 0.1830  
## 113 8 800 0.2 0.188625 0.1830  
## 114 8 800 0.4 0.191500 0.1820  
## 115 8 800 0.6 0.193250 0.1820  
## 116 8 1000 0.0 0.239000 0.2335  
## 117 8 1000 0.1 0.188375 0.1835  
## 118 8 1000 0.2 0.188750 0.1810  
## 119 8 1000 0.4 0.191500 0.1820  
## 120 8 1000 0.6 0.193250 0.1820

Among all the models that converged, there are three models have smallest value below 1000.

The model with node=5, maxit=800, decay=0 has the smallest final value converged at 990.400979. Its training missclassification rate is 18.65%, and validation missclassfication rate is 17.95%

The model with node=7, maxit=750, decay=0 has the smallest final value converged at 978.248201. Its training missclassification rate is 18.44%, and validation missclassfication rate is 18.8%

The model with node=7, maxit=800, decay=0 has the smallest final value converged at 980.799262. Its training missclassification rate is 18.29%, and validation missclassfication rate is 18.6%

So the best network is seed=550, node=5, decay=0.0, maxit=800, with a final value of 990.400979 converged between 520 to 530 iteration. Its training missclassification rate is 18.65%, and validation missclassfication rate is 17.95%

### 6.

female

m = dim(newdat\_training)[2]  
means = NA  
for (i in 1:m)  
{  
means[i]=mean(newdat\_training[,i])  
}  
  
FemaleMarriedPrivWh.pred.vector<-c(rep(0,5),rep(1,2),rep(0,5),1,  
means[14],means[15],means[16])  
mean.vector<-seq(0,1,0.01)  
nm<-length(mean.vector)  
FemaleMarriedPrivWh.sens.age<-data.frame(matrix(rep(FemaleMarriedPrivWh.pred.vector,each=nm),nrow=nm))  
colnames(FemaleMarriedPrivWh.sens.age)<-names(newdat\_training)  
FemaleMarriedPrivWh.sens.age[,14]<-mean.vector  
FemaleMarriedPrivWh.sens.age.probs<-predict(net.dat,FemaleMarriedPrivWh.sens.age)  
FemaleMarriedPrivWh.sens.age.probs

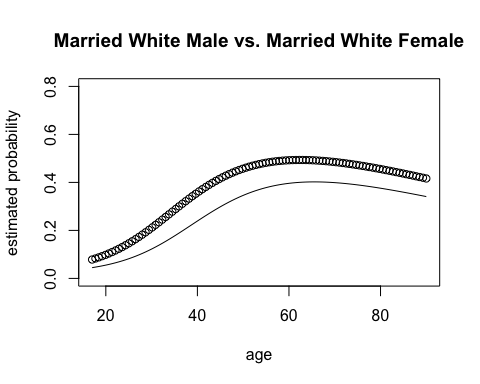
## [,1]  
## 1 0.04480918  
## 2 0.04708253  
## 3 0.04953956  
## 4 0.05219280  
## 5 0.05505515  
## 6 0.05813974  
## 7 0.06145980  
## 8 0.06502849  
## 9 0.06885872  
## 10 0.07296292  
## 11 0.07735279  
## 12 0.08203903  
## 13 0.08703103  
## 14 0.09233659  
## 15 0.09796156  
## 16 0.10390959  
## 17 0.11018174  
## 18 0.11677628  
## 19 0.12368841  
## 20 0.13091007  
## 21 0.13842981  
## 22 0.14623275  
## 23 0.15430057  
## 24 0.16261162  
## 25 0.17114111  
## 26 0.17986137  
## 27 0.18874223  
## 28 0.19775135  
## 29 0.20685477  
## 30 0.21601735  
## 31 0.22520333  
## 32 0.23437682  
## 33 0.24350233  
## 34 0.25254526  
## 35 0.26147233  
## 36 0.27025197  
## 37 0.27885467  
## 38 0.28725320  
## 39 0.29542286  
## 40 0.30334160  
## 41 0.31099005  
## 42 0.31835162  
## 43 0.32541240  
## 44 0.33216111  
## 45 0.33858897  
## 46 0.34468960  
## 47 0.35045881  
## 48 0.35589446  
## 49 0.36099628  
## 50 0.36576564  
## 51 0.37020543  
## 52 0.37431983  
## 53 0.37811414  
## 54 0.38159466  
## 55 0.38476848  
## 56 0.38764338  
## 57 0.39022770  
## 58 0.39253017  
## 59 0.39455990  
## 60 0.39632618  
## 61 0.39783849  
## 62 0.39910636  
## 63 0.40013935  
## 64 0.40094698  
## 65 0.40153868  
## 66 0.40192375  
## 67 0.40211134  
## 68 0.40211042  
## 69 0.40192976  
## 70 0.40157787  
## 71 0.40106307  
## 72 0.40039341  
## 73 0.39957669  
## 74 0.39862046  
## 75 0.39753198  
## 76 0.39631830  
## 77 0.39498616  
## 78 0.39354207  
## 79 0.39199229  
## 80 0.39034280  
## 81 0.38859938  
## 82 0.38676754  
## 83 0.38485256  
## 84 0.38285951  
## 85 0.38079323  
## 86 0.37865833  
## 87 0.37645926  
## 88 0.37420023  
## 89 0.37188527  
## 90 0.36951825  
## 91 0.36710283  
## 92 0.36464251  
## 93 0.36214065  
## 94 0.35960042  
## 95 0.35702486  
## 96 0.35441685  
## 97 0.35177916  
## 98 0.34911440  
## 99 0.34642508  
## 100 0.34371356  
## 101 0.34098210

Male

MaleMarriedPrivWh.pred.vector<-c(1,rep(0,4),rep(1,2),rep(0,5),1,means[14],means[15],means[16])  
MaleMarriedPrivWh.sens.age<-data.frame(matrix(rep(MaleMarriedPrivWh.pred.vector,each=nm),nrow=nm))  
colnames(MaleMarriedPrivWh.sens.age)<-names(newdat\_training)  
MaleMarriedPrivWh.sens.age[,14]<-mean.vector  
MaleMarriedPrivWh.sens.age.probs<-predict(net.dat,MaleMarriedPrivWh.sens.age)  
MaleMarriedPrivWh.sens.age.probs

## [,1]  
## 1 0.07855875  
## 2 0.08293844  
## 3 0.08763693  
## 4 0.09266928  
## 5 0.09804961  
## 6 0.10379084  
## 7 0.10990424  
## 8 0.11639907  
## 9 0.12328218  
## 10 0.13055762  
## 11 0.13822624  
## 12 0.14628533  
## 13 0.15472836  
## 14 0.16354469  
## 15 0.17271944  
## 16 0.18223341  
## 17 0.19206314  
## 18 0.20218105  
## 19 0.21255569  
## 20 0.22315211  
## 21 0.23393237  
## 22 0.24485603  
## 23 0.25588080  
## 24 0.26696321  
## 25 0.27805928  
## 26 0.28912519  
## 27 0.30011796  
## 28 0.31099602  
## 29 0.32171980  
## 30 0.33225214  
## 31 0.34255872  
## 32 0.35260832  
## 33 0.36237304  
## 34 0.37182842  
## 35 0.38095344  
## 36 0.38973054  
## 37 0.39814548  
## 38 0.40618722  
## 39 0.41384772  
## 40 0.42112172  
## 41 0.42800654  
## 42 0.43450179  
## 43 0.44060915  
## 44 0.44633212  
## 45 0.45167579  
## 46 0.45664657  
## 47 0.46125205  
## 48 0.46550074  
## 49 0.46940192  
## 50 0.47296547  
## 51 0.47620174  
## 52 0.47912139  
## 53 0.48173531  
## 54 0.48405450  
## 55 0.48608999  
## 56 0.48785278  
## 57 0.48935377  
## 58 0.49060370  
## 59 0.49161314  
## 60 0.49239241  
## 61 0.49295161  
## 62 0.49330053  
## 63 0.49344870  
## 64 0.49340536  
## 65 0.49317943  
## 66 0.49277952  
## 67 0.49221395  
## 68 0.49149070  
## 69 0.49061749  
## 70 0.48960169  
## 71 0.48845041  
## 72 0.48717048  
## 73 0.48576840  
## 74 0.48425046  
## 75 0.48262264  
## 76 0.48089068  
## 77 0.47906008  
## 78 0.47713610  
## 79 0.47512376  
## 80 0.47302787  
## 81 0.47085302  
## 82 0.46860362  
## 83 0.46628385  
## 84 0.46389773  
## 85 0.46144909  
## 86 0.45894161  
## 87 0.45637878  
## 88 0.45376394  
## 89 0.45110029  
## 90 0.44839088  
## 91 0.44563864  
## 92 0.44284634  
## 93 0.44001666  
## 94 0.43715213  
## 95 0.43425520  
## 96 0.43132819  
## 97 0.42837332  
## 98 0.42539272  
## 99 0.42238842  
## 100 0.41936237  
## 101 0.41631641

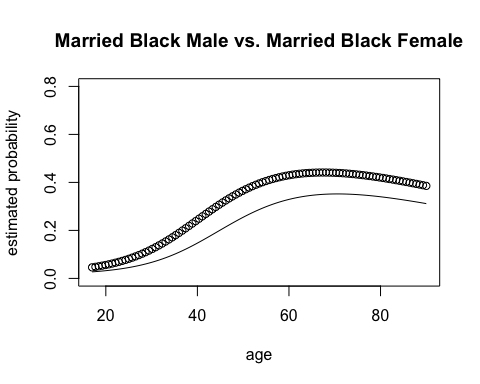
plot(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
FemaleMarriedPrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="age",  
ylab="estimated probability",main="Married White Male vs. Married White Female")  
  
points(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
MaleMarriedPrivWh.sens.age.probs,xlab="age",ylab="estimated probability" )



The line is female, the points line is male. There is a monotone relation between age and probability of income, the probablity increase and reaching to 0.6 with age increase. Two lines are almost parallel and there is a clear gap between two genders with race and marital status same. It indicates income inequality between gender. Male has a higher probability than female in all ages.

### change race to black

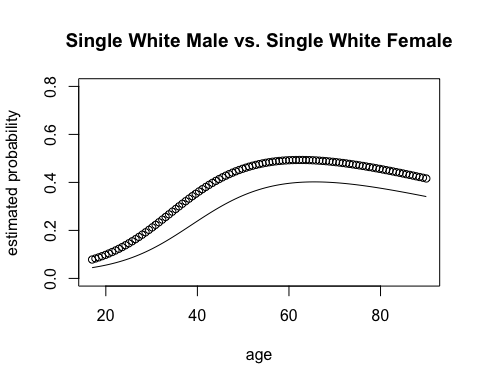
m = dim(newdat\_training)[2]  
means = NA  
for (i in 1:m)  
{  
means[i]=mean(newdat\_training[,i])  
}  
  
BFemaleMarriedPrivWh.pred.vector<-c(rep(0,5),rep(1,2),rep(0,4),1,0,  
means[14],means[15],means[16])  
mean.vector<-seq(0,1,0.01)  
nm<-length(mean.vector)  
BFemaleMarriedPrivWh.sens.age<-data.frame(matrix(rep(BFemaleMarriedPrivWh.pred.vector,each=nm),nrow=nm))  
colnames(BFemaleMarriedPrivWh.sens.age)<-names(newdat\_training)  
BFemaleMarriedPrivWh.sens.age[,14]<-mean.vector  
BFemaleMarriedPrivWh.sens.age.probs<-predict(net.dat,BFemaleMarriedPrivWh.sens.age)  
  
  
BMaleMarriedPrivWh.pred.vector<-c(1,rep(0,4),rep(1,2),rep(0,4),1,0,means[14],means[15],means[16])  
BMaleMarriedPrivWh.sens.age<-data.frame(matrix(rep(BMaleMarriedPrivWh.pred.vector,each=nm),nrow=nm))  
colnames(BMaleMarriedPrivWh.sens.age)<-names(newdat\_training)  
BMaleMarriedPrivWh.sens.age[,14]<-mean.vector  
BMaleMarriedPrivWh.sens.age.probs<-predict(net.dat,BMaleMarriedPrivWh.sens.age)  
  
  
plot(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
BFemaleMarriedPrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="age",  
ylab="estimated probability",main="Married Black Male vs. Married Black Female")  
  
points(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
BMaleMarriedPrivWh.sens.age.probs,xlab="age",ylab="estimated probability" )



The line is female, the points line is male. Similer to the white group, there is a monotone b relation between age and probability of income greater than 50K. For both genders, the probablity increase with age increase, the rate slow down after age 60 and reach stable. Two lines are parallel and there is a clear gap between two lines which indicates income inequality between gender.

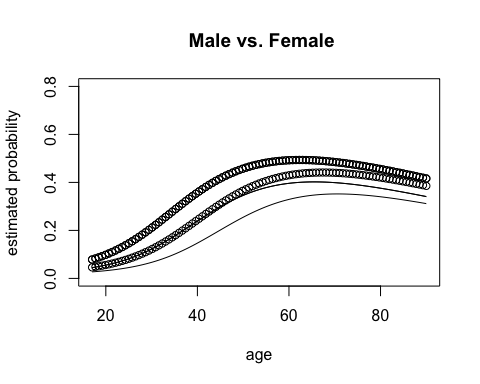
### change married to single

m = dim(newdat\_training)[2]  
means = NA  
for (i in 1:m)  
{  
means[i]=mean(newdat\_training[,i])  
}  
  
FemaleSinglePrivWh.pred.vector<-c(rep(0,6),rep(1,1),rep(0,5),1,  
means[14],means[15],means[16])  
mean.vector<-seq(0,1,0.01)  
nm<-length(mean.vector)  
FemaleSinglePrivWh.sens.age<-data.frame(matrix(rep(FemaleSinglePrivWh.pred.vector,each=nm),nrow=nm))  
colnames(FemaleSinglePrivWh.sens.age)<-names(newdat\_training)  
FemaleSinglePrivWh.sens.age[,14]<-mean.vector  
FemaleSinglePrivWh.sens.age.probs<-predict(net.dat,FemaleSinglePrivWh.sens.age)  
  
  
MaleSinglePrivWh.pred.vector<-c(1,rep(0,5),rep(1,1),rep(0,5),1,means[14],means[15],means[16])  
MaleSinglePrivWh.sens.age<-data.frame(matrix(rep(MaleSinglePrivWh.pred.vector,each=nm),nrow=nm))  
colnames(MaleSinglePrivWh.sens.age)<-names(newdat\_training)  
MaleSinglePrivWh.sens.age[,14]<-mean.vector  
MaleSinglePrivWh.sens.age.probs<-predict(net.dat,MaleSinglePrivWh.sens.age)  
  
  
plot(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
FemaleSinglePrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="age",  
ylab="estimated probability",main="Single White Male vs. Single White Female")  
  
points(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
MaleSinglePrivWh.sens.age.probs,xlab="age",ylab="estimated probability" )



Similer to the married group, there is a monotone relation between age and probability of income greater than 50K. For both genders, the probablity increase with age increase, the rate slow down after age 60 and reach stable. Two lines are parallel and there is a clear gap between two lines which indicates income inequality between gender.

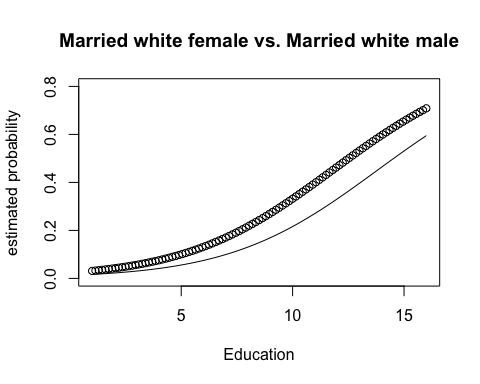
plot(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
FemaleMarriedPrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="age",  
ylab="estimated probability",main=" Male vs. Female")  
  
points(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
MaleMarriedPrivWh.sens.age.probs,xlab="age",ylab="estimated probability" )  
  
lines(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
BFemaleMarriedPrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="age",  
ylab="estimated probability",main="Male vs. Female")  
  
points(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
BMaleMarriedPrivWh.sens.age.probs,xlab="age",ylab="estimated probability" )  
  
lines(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
FemaleSinglePrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="age",  
ylab="estimated probability",main="Male vs. Female")  
  
points(mean.vector\*(max(adult$age)-min(adult$age))+ min(adult$age),  
MaleSinglePrivWh.sens.age.probs,xlab="age",ylab="estimated probability" )



Based on the plots, sex modifies the relatioship between age and the output the most. There is some difference due to race between married white and married black’s probability of income greater than 50K, as white male and female tend to have a higher probability than black male and black female, and there is no big differnece between single white and married white. But there is a clear differnece between gender among all plots that female always have lower porbability than males.

### b)

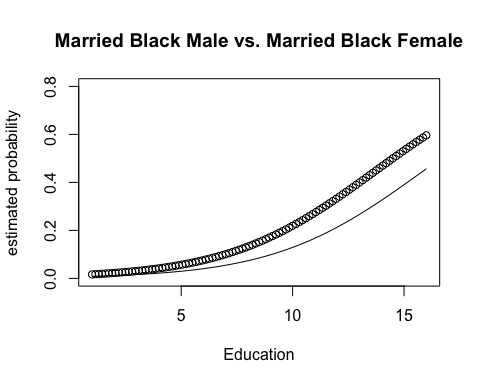
m = dim(newdat\_training)[2]  
means = NA  
for (i in 1:m)  
{  
means[i]=mean(newdat\_training[,i])  
}  
  
EduFemaleMarriedPrivWh.pred.vector<-c(rep(0,5),rep(1,2),rep(0,5),1,  
means[14],means[15],means[16])  
mean.vector<-seq(0,1,0.01)  
nm<-length(mean.vector)  
EduFemaleMarriedPrivWh.sens.age<-data.frame(matrix(rep(EduFemaleMarriedPrivWh.pred.vector,each=nm),nrow=nm))  
colnames(EduFemaleMarriedPrivWh.sens.age)<-names(newdat\_training)  
EduFemaleMarriedPrivWh.sens.age[,15]<-mean.vector  
EduFemaleMarriedPrivWh.sens.age.probs<-predict(net.dat,EduFemaleMarriedPrivWh.sens.age)  
  
  
EduMaleMarriedPrivWh.pred.vector<-c(1,rep(0,4),rep(1,2),rep(0,5),1,means[14],means[15],means[16])  
EduMaleMarriedPrivWh.sens.age<-data.frame(matrix(rep(EduMaleMarriedPrivWh.pred.vector,each=nm),nrow=nm))  
colnames(EduMaleMarriedPrivWh.sens.age)<-names(newdat\_training)  
EduMaleMarriedPrivWh.sens.age[,15]<-mean.vector  
EduMaleMarriedPrivWh.sens.age.probs<-predict(net.dat,EduMaleMarriedPrivWh.sens.age)  
  
  
plot(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
EduFemaleMarriedPrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="Education",  
ylab="estimated probability",main="Married white female vs. Married white male")  
  
points(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
EduMaleMarriedPrivWh.sens.age.probs,xlab="Education",ylab="estimated probability" )



Points line is male, solid line is female. There is monotone relationship between edu.num and probability of income greater than 50K. With longer education years, there is a higher probability to get income greater than 50K. Male tend to have a greater probability than female with longer education, and the gap gets larger with longer education years.

### change race to black

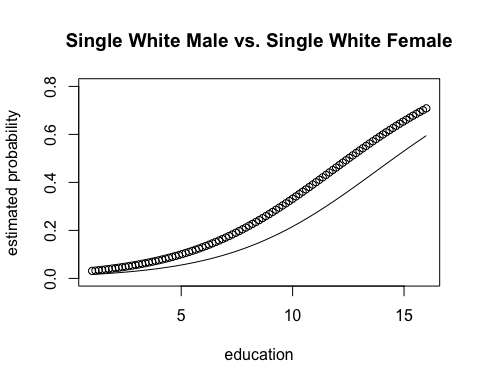
m = dim(newdat\_training)[2]  
means = NA  
for (i in 1:m)  
{  
means[i]=mean(newdat\_training[,i])  
}  
  
BFemaleMarriedPrivWh.pred.vector<-c(rep(0,5),rep(1,2),rep(0,4),1,0,  
means[14],means[15],means[16])  
mean.vector<-seq(0,1,0.01)  
nm<-length(mean.vector)  
BFemaleMarriedPrivWh.sens.age<-data.frame(matrix(rep(BFemaleMarriedPrivWh.pred.vector,each=nm),nrow=nm))  
colnames(BFemaleMarriedPrivWh.sens.age)<-names(newdat\_training)  
BFemaleMarriedPrivWh.sens.age[,15]<-mean.vector  
BFemaleMarriedPrivWh.sens.age.probs<-predict(net.dat,BFemaleMarriedPrivWh.sens.age)  
  
  
BMaleMarriedPrivWh.pred.vector<-c(1,rep(0,4),rep(1,2),rep(0,4),1,0,means[14],means[15],means[16])  
BMaleMarriedPrivWh.sens.age<-data.frame(matrix(rep(BMaleMarriedPrivWh.pred.vector,each=nm),nrow=nm))  
colnames(BMaleMarriedPrivWh.sens.age)<-names(newdat\_training)  
BMaleMarriedPrivWh.sens.age[,15]<-mean.vector  
BMaleMarriedPrivWh.sens.age.probs<-predict(net.dat,BMaleMarriedPrivWh.sens.age)  
  
plot(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
BFemaleMarriedPrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="Education",  
ylab="estimated probability",main="Married Black Male vs. Married Black Female")  
  
points(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
BMaleMarriedPrivWh.sens.age.probs,xlab="age",ylab="estimated probability" )



The plot gives similar conclusion as white group. Points line is male, solid line is female. There is monotone relationship between edu.num and probability of income greater than 50K. With longer education years, there is a higher probability to get that much income. Male tend to have a greater probability than female for higher income and the gap gets larger as the education length gets larger.

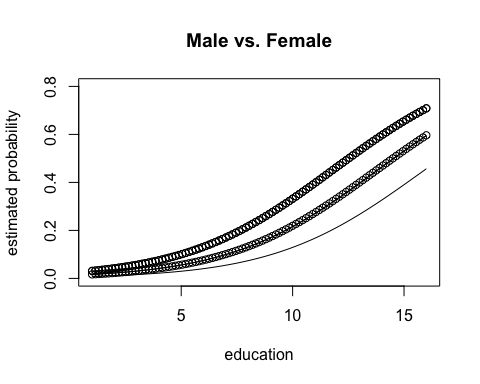
### change married to single

m = dim(newdat\_training)[2]  
means = NA  
for (i in 1:m)  
{  
means[i]=mean(newdat\_training[,i])  
}  
  
FemaleSinglePrivWh.pred.vector<-c(rep(0,6),rep(1,1),rep(0,5),1,  
means[14],means[15],means[16])  
mean.vector<-seq(0,1,0.01)  
nm<-length(mean.vector)  
FemaleSinglePrivWh.sens.age<-data.frame(matrix(rep(FemaleSinglePrivWh.pred.vector,each=nm),nrow=nm))  
colnames(FemaleSinglePrivWh.sens.age)<-names(newdat\_training)  
FemaleSinglePrivWh.sens.age[,15]<-mean.vector  
FemaleSinglePrivWh.sens.age.probs<-predict(net.dat,FemaleSinglePrivWh.sens.age)  
  
  
MaleSinglePrivWh.pred.vector<-c(1,rep(0,5),rep(1,1),rep(0,5),1,means[14],means[15],means[16])  
MaleSinglePrivWh.sens.age<-data.frame(matrix(rep(MaleSinglePrivWh.pred.vector,each=nm),nrow=nm))  
colnames(MaleSinglePrivWh.sens.age)<-names(newdat\_training)  
MaleSinglePrivWh.sens.age[,15]<-mean.vector  
MaleSinglePrivWh.sens.age.probs<-predict(net.dat,MaleSinglePrivWh.sens.age)  
  
  
plot(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
FemaleSinglePrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="education",  
ylab="estimated probability",main="Single White Male vs. Single White Female")  
  
points(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
MaleSinglePrivWh.sens.age.probs,xlab="age",ylab="estimated probability" )



The plot gives similar conclusion as married group. Points line is male, solid line is female. There is monotone relationship between edu.num and probability of income greater than 50K. With longer education years, there is a higher probability to get income greater than 50K. Male tend to have a greater probability than female for higher income and the gap gets larger as the education length gets larger.

plot(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
FemaleSinglePrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="education",  
ylab="estimated probability",main="Male vs. Female")  
  
points(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
MaleSinglePrivWh.sens.age.probs,xlab="age",ylab="estimated probability" )  
  
lines(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
BFemaleMarriedPrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="Education",  
ylab="estimated probability",main="Male vs.Female")  
  
points(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
BMaleMarriedPrivWh.sens.age.probs,xlab="age",ylab="estimated probability" )  
  
lines(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
EduFemaleMarriedPrivWh.sens.age.probs,ylim=c(0,0.8),type="l",xlab="Education",  
ylab="estimated probability",main="Male vs. Female")  
  
points(mean.vector\*(max(adult$education.num)-min(adult$education.num))+ min(adult$education.num),  
EduMaleMarriedPrivWh.sens.age.probs,xlab="Education",ylab="estimated probability" )



Based on the plots, sex modifies the relatioship between education years and the output the most. There is difference between married white and married black’s probability of income greater than 50K, as white male and female tend to have a higher probability than black male and black female, and there is no differnece between single white and married white. But there is a clear differnece between gender among all plots that female always have lower porbability than males. So marital status has no impact, race has some impact, and sex difference has impact in all plots.