Breast Cancer Project

```
options(digits = 3)
library(matrixStats)
library(tidyverse)
```

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

## v ggplot2 3.3.3     v purrr   0.3.4
## v tibble  3.1.2     v dplyr   1.0.5
## v tidyr   1.1.3     v stringr 1.4.0
## v readr   1.4.0     v forcats 0.5.1

## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::count()  masks matrixStats::count()
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(caret)
```

```
## Loading required package: lattice

##
## Attaching package: 'caret'

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

```
library(dslabs)
data(brca)
```

Question 1: Dimensions and Properties

```
dim(brca$x)
```

```
## [1] 569  30
```

```
length(brca$y)
```

```
## [1] 569
```

```
y <- brca$y
#proportion of the samples that are malignant
mean(brca$y == 'M')
```

```
## [1] 0.373
```

```
#Which column number has the highest mean?
which.max(colMeans(brca$x))
```

```
## area_worst
##         24
```

```
##Which column number has the lowest std dev?
which.min(colSds(brca$x))
```

```
## [1] 20
```

Question 2: Scaling the Matrix

```
x_centered <- sweep(brca$x, 2, colMeans(brca$x))
x_scaled <- sweep(x_centered, 2, colSds(brca$x), FUN = "/")

#sd of first column
apply(x_scaled, 2, sd)
```

```
##       radius_mean      texture_mean    perimeter_mean         area_mean
##                 1                 1                 1                 1
##   smoothness_mean  compactness_mean    concavity_mean  concave_pts_mean
##                 1                 1                 1                 1
##     symmetry_mean  fractal_dim_mean         radius_se        texture_se
##                 1                 1                 1                 1
##      perimeter_se           area_se     smoothness_se    compactness_se
##                 1                 1                 1                 1
##      concavity_se    concave_pts_se       symmetry_se    fractal_dim_se
##                 1                 1                 1                 1
##      radius_worst     texture_worst   perimeter_worst        area_worst
##                 1                 1                 1                 1
##  smoothness_worst compactness_worst   concavity_worst concave_pts_worst
##                 1                 1                 1                 1
##    symmetry_worst fractal_dim_worst
##                 1                 1
```

```
#median of first column
apply(x_scaled, 2, median)
```

```
##       radius_mean      texture_mean    perimeter_mean         area_mean
##           -0.2149           -0.1045           -0.2358           -0.2949
##   smoothness_mean  compactness_mean    concavity_mean  concave_pts_mean
##           -0.0349           -0.2217           -0.3419           -0.3974
##     symmetry_mean  fractal_dim_mean         radius_se        texture_se
```

```
##           -0.0716           -0.1781           -0.2920           -0.1973
##      perimeter_se           area_se     smoothness_se    compactness_se
##           -0.2864           -0.3475           -0.2201           -0.2808
##      concavity_se    concave_pts_se       symmetry_se    fractal_dim_se
##           -0.1989           -0.1404           -0.2192           -0.2297
##      radius_worst     texture_worst   perimeter_worst        area_worst
##           -0.2688           -0.0435           -0.2857           -0.3409
##  smoothness_worst compactness_worst   concavity_worst concave_pts_worst
##           -0.0468           -0.2693           -0.2180           -0.2233
##    symmetry_worst fractal_dim_worst
##           -0.1273           -0.2163
```

Question 3: Calculate the distance between all samples using the scaled matrix

```
dists <- dist(x_scaled)
dists <- as.matrix(dists)

#average distance between the first sample, which is benign, and other benign samples
dists_1 <- dists[1, (y == 'B')]
mean(dists_1[2:length(dists_1)])
```

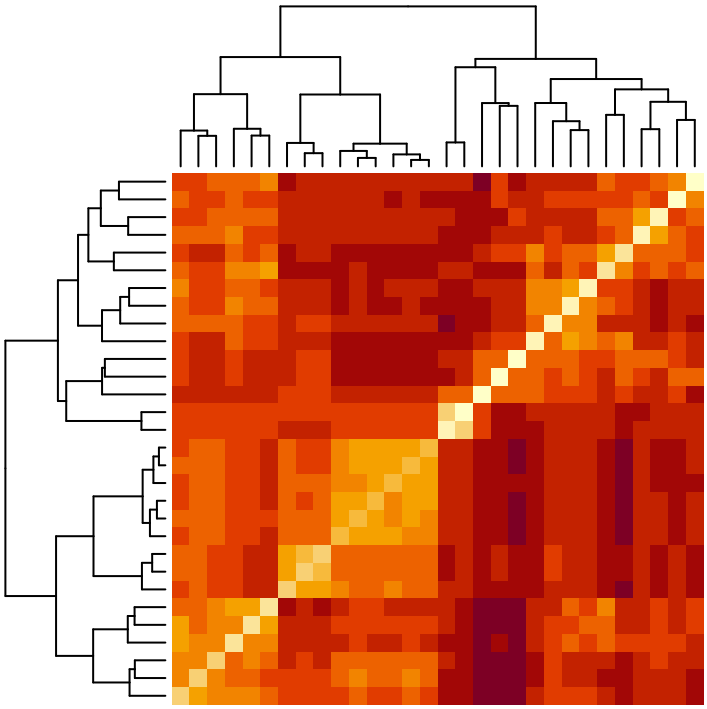
```
## [1] 4.41
```

```
#average distance between the first sample and malignant samples
dists_2 <- dists[1, (y == 'M')]
mean(dists_2)
```

```
## [1] 7.12
```

Question 4: Make a heatmap of the relationship between features using the scaled matrix

```
d_features <- dist(t(x_scaled))
heatmap(as.matrix(d_features), labRow = NA, labCol = NA)
```



Question 5: Perform hierarchical clustering on the 30 features. Cut the tree into 5 groups.

```
hc <- hclust(d_features)
y_hc <- cutree(hc, k=5)

split(names(y_hc), y_hc)
```

```
## $`1`
##  [1] "radius_mean"       "perimeter_mean"    "area_mean"
##  [4] "concavity_mean"    "concave_pts_mean"  "radius_se"
##  [7] "perimeter_se"      "area_se"           "radius_worst"
## [10] "perimeter_worst"   "area_worst"        "concave_pts_worst"
##
## $`2`
## [1] "texture_mean"  "texture_worst"
##
## $`3`
## [1] "smoothness_mean"   "compactness_mean"  "symmetry_mean"
## [4] "fractal_dim_mean"  "smoothness_worst"  "compactness_worst"
## [7] "concavity_worst"   "symmetry_worst"    "fractal_dim_worst"
##
## $`4`
## [1] "texture_se"    "smoothness_se" "symmetry_se"
##
## $`5`
## [1] "compactness_se" "concavity_se"   "concave_pts_se" "fractal_dim_se"
```

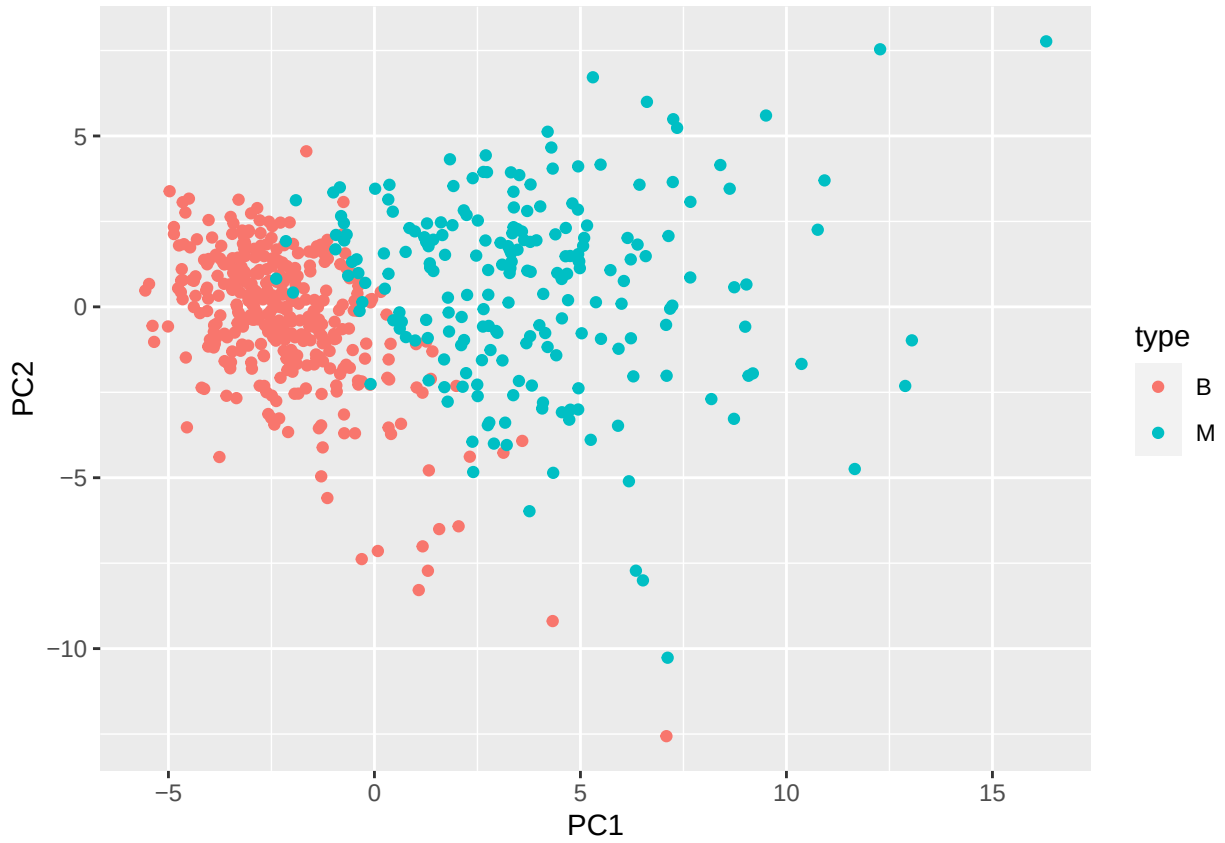
Question 6: Perform a principal component analysis of the scaled matrix

```
pca <- prcomp(x_scaled)
#proportion of variance explained by the first principal component
summary(pca)
```

```
## Importance of components:
##                           PC1   PC2    PC3   PC4   PC5    PC6    PC7    PC8
## Standard deviation     3.644 2.386 1.6787 1.407 1.284 1.0988 0.8217 0.6904
## Proportion of Variance 0.443 0.190 0.0939 0.066 0.055 0.0403 0.0225 0.0159
## Cumulative Proportion  0.443 0.632 0.7264 0.792 0.847 0.8876 0.9101 0.9260
##                           PC9   PC10   PC11    PC12    PC13    PC14    PC15
## Standard deviation     0.6457 0.5922 0.5421 0.51104 0.49128 0.39624 0.30681
## Proportion of Variance 0.0139 0.0117 0.0098 0.00871 0.00805 0.00523 0.00314
## Cumulative Proportion  0.9399 0.9516 0.9614 0.97007 0.97812 0.98335 0.98649
##                           PC16    PC17    PC18    PC19    PC20  PC21    PC22
## Standard deviation     0.28260 0.24372 0.22939 0.22244 0.17652 0.173 0.16565
## Proportion of Variance 0.00266 0.00198 0.00175 0.00165 0.00104 0.001 0.00091
## Cumulative Proportion  0.98915 0.99113 0.99288 0.99453 0.99557 0.997 0.99749
##                           PC23   PC24    PC25    PC26    PC27    PC28    PC29
## Standard deviation     0.15602 0.1344 0.12442 0.09043 0.08307 0.03987 0.02736
## Proportion of Variance 0.00081 0.0006 0.00052 0.00027 0.00023 0.00005 0.00002
## Cumulative Proportion  0.99830 0.9989 0.99942 0.99969 0.99992 0.99997 1.00000
##                           PC30
## Standard deviation     0.0115
## Proportion of Variance 0.0000
## Cumulative Proportion  1.0000
```

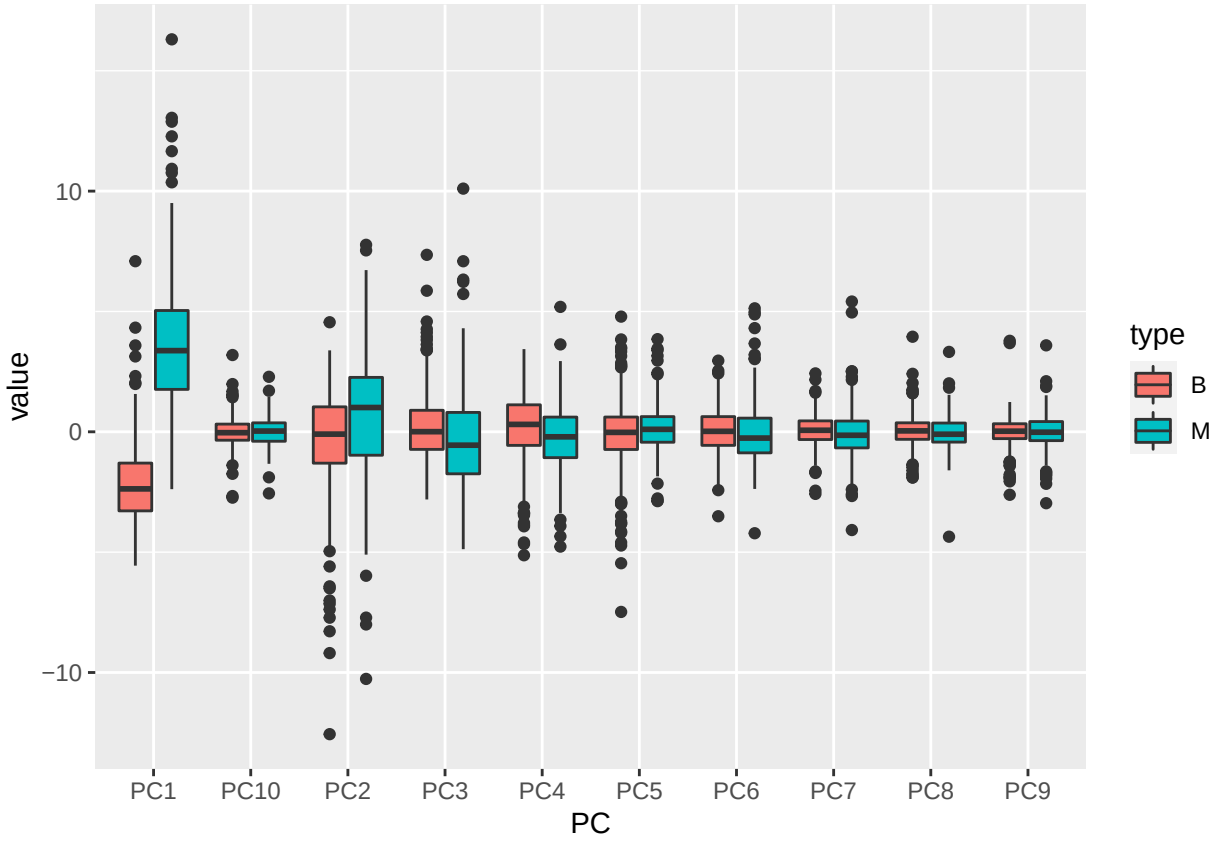
Question 7: Plot the first two principal components with color representing tumor type

```
pcs <- data.frame(pca$x[,1:2], type = brca$y)
ggplot(pcs) + geom_point(aes(PC1, PC2, col = type))
```



Question 8: Make a boxplot of the first 10 PCs grouped by tumor type

```
data.frame(type = brca$y, pca$x[,1:10]) %>%
    gather(key = "PC", value = "value", -type) %>%
    ggplot(aes(PC, value, fill = type)) +
    geom_boxplot()
```



Create a data partition splitting brca_y and the scaled version of the brca_x matrix into a 20% test set and 80% train

```
set.seed(1, sample.kind = "Rounding")
```

```
## Warning in set.seed(1, sample.kind = "Rounding"): non-uniform 'Rounding' sampler
## used
```

```
test_index <- createDataPartition(brca$y, times = 1, p = 0.2, list = FALSE)
test_x <- x_scaled[test_index,]
test_y <- brca$y[test_index]
train_x <- x_scaled[-test_index,]
train_y <- brca$y[-test_index]
```

Question 9: Training and Test sets

```
#proportion of the training set that is benign
mean(train_y == 'B')
```

```
## [1] 0.628
```

```
#proportion of the test set that is benign
mean(test_y == 'B')
```

```
## [1] 0.626
```

Question 10a: K-means Clustering

```
#two arguments: a matrix of observations x and a k-means object k - and assigns each row of x to a clus
predict_kmeans <- function(x, k) {
    centers <- k$centers    # extract cluster centers
    # calculate distance to cluster centers
    distances <- sapply(1:nrow(x), function(i){
                        apply(centers, 1, function(y) dist(rbind(x[i,], y)))
                })
  max.col(-t(distances))  # select cluster with min distance to center
}
```

Perform k-means clustering on the training set with 2 centers and assign the output to k

```
set.seed(3, sample.kind = "Rounding")
```

```
## Warning in set.seed(3, sample.kind = "Rounding"): non-uniform 'Rounding' sampler
## used
```

```
k <- kmeans(train_x, centers = 2)
kmeans_preds <- ifelse(predict_kmeans(test_x, k) == 1, "B", "M")
mean(kmeans_preds == test_y)
```

```
## [1] 0.922
```

Question 10b: Proportion of benign and malignant tumors that are correctly identified

```
table(test_y,kmeans_preds)
```

```
##       kmeans_preds
## test_y  B  M
##      B 71  1
##      M  8 35
```

```
71/79
```

```
## [1] 0.899
```

```
35/36
```

```
## [1] 0.972
```

Question 11: Logistic Regression Model

```
logistic_model <- train(x = train_x, y = train_y, method = "glm")
```

```
## Warning in (function (kind = NULL, normal.kind = NULL, sample.kind = NULL) :
## non-uniform 'Rounding' sampler used
```

```
## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

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## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
```

```
## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
```

```r
logistic_pred <- predict(logistic_model, test_x)
mean(logistic_pred == test_y)
```

```
## [1] 0.957
```

Question 12: LDA and QDA models

```r
#lda
lda_model <- train(x = train_x, y = train_y, method = "lda")
```

```
## Warning in (function (kind = NULL, normal.kind = NULL, sample.kind = NULL) :
## non-uniform 'Rounding' sampler used
```

```r
lda_pred <- predict(lda_model, test_x)
mean(lda_pred == test_y)
```

```
## [1] 0.991
```

```r
#qda
qda_model <- train(x = train_x, y = train_y, method = "qda")
```

```
## Warning in (function (kind = NULL, normal.kind = NULL, sample.kind = NULL) :
## non-uniform 'Rounding' sampler used
```

```r
qda_pred <- predict(qda_model, test_x)
mean(qda_pred == test_y)
```

```
## [1] 0.957
```

Question 13: Loess Model

```r
set.seed(5, sample.kind = "Rounding")
```

```
## Warning in set.seed(5, sample.kind = "Rounding"): non-uniform 'Rounding' sampler
## used
```

```r
loess_model <- train(x = train_x, y = train_y, method = "gamLoess")
```

```
## Warning in (function (kind = NULL, normal.kind = NULL, sample.kind = NULL) :
## non-uniform 'Rounding' sampler used
```

```
## Loading required package: gam
```

```
## Loading required package: splines
```

```
## Loading required package: foreach
```

```
##
## Attaching package: 'foreach'

## The following objects are masked from 'package:purrr':
##
##     accumulate, when

## Loaded gam 1.20

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## 3.9519

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.7972

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.3974

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.187

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.4808

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.187

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.992

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.187

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 4.7667

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.3085

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -3.1093

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.3081

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 3.4371

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.3085
```

```
## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.2273

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -2.1051

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 4.0906

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5146

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.1591

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0652

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 4.9499

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.7588

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.5315

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3614

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 7.0657
```

```
## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.7588

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## -2.222

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -2.1724

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.8825

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.2373

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.4953

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.2373

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 4.2836

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6585

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.9245

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.694

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## 4.5644

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.9476

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 11.032

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 10.724

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 5.4251

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.9374

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4812

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.1602

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 5.925

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.1602

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.4864

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.3815

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.4885

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.3815

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 4.0906

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.3815
```

```
## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.7152

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.1736

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.9678

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.1736

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.2924

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.1736

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.772

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.1736

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 4.7667

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.4698

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## eval 2.6835
```

```
## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.6399

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## eval 2.6729

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.6399

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.5315

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3731

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 3.3789

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.2009

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 3.6318

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.2009

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 4.2836

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.2009

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.0184

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.9613

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.1591

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.9613

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.0249

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.9613

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.7092

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.2993

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9726

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.2993

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.3841

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.2993
```

```
## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9068

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.2993

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4052

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.2911

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.7499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 9.058

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 9.4537

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0831

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 7.8067
```

```
## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0831

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval -1.591

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5364

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval -1.6004

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5364

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval -1.5888

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5364

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 4.5327

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.5002

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2402

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.5002

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 3.8507

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.5002

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2459

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.5002

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 8.8991

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.0056

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 7.7235

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.0056

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 5.925

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5097

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 10.667

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 4.26
```

```
## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 11.032
```

```
## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 4.26
```

```
## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 7.2466
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0279

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8554

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.1763

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8797

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.1581

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8797

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.7254

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.5989

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 4.7667

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.3085

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -3.1093

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.3081

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 3.4371

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.3085

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 4.9499

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.7598

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 7.0657

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.7598

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.6919

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5997

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 6.8408

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.9633
```

```
## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## -1.4532

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.4098

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 5.4251

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.9374

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.8825

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5238

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 5.1084

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.3735

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.9245

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.5179

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.5791
```

```
## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.5179

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.6693

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.5179

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## -1.9828

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8392

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## -1.2545

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.2442

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 6.1381

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.5474

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## 4.5644

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.9476

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.2213
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1893
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.1763

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8797

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.1581

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8797
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.7254

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.5959

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 4.0906

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5138

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0279

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8541

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.9678

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.743

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.772

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.743

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 7.0657
```

```
## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.9823

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## 6.0407

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6905

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## 4.1043

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6905

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## 4.6442

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6905

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## 4.9066

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## upperlimit 4.6997

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.6919

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5965

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 4.2836

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6578

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## -1.4532

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.4063

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2402

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5622

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2459

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5622

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.8825

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5238

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 8.8991

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.0056
```

```
## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 7.7235

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.0056

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 10.667

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 4.26

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 11.032

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 4.26

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## -1.4692

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.4122

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## -1.4739

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.4122

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## 4.5644
```

```
## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.9472

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 4.0576

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.6109

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 9.4537

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.6109

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 7.8067

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.6109

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## -1.9828

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8404

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9726

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.7369

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9068

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.7369

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval -1.3225

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.3219

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval -1.341

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.3219

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## -1.2155

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.199

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## -1.2545

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.199

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.2213

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1821
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 5.925
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5094
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## 3.9519

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.7972
```

```
## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0279

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.852

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.7152

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.318

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.9678

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.318

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.772

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.318

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.7254

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.5959

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 4.0906
```

```
## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5138

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -2.2803

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.1766

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 4.7667

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.3078

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -3.1093

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.1766

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 3.4371

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.3078

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.7499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.6919

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5965

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 4.2836

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6578

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 9.4537

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0831

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 7.8067

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0831

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## -1.9828

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8363

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.7092

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.4101
```

```
## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9726

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.4101

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9068

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.4101

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 4.6965

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.0184

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 9.0077

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.054

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.054

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## -1.4532
```

```
## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.4029

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 4.5327

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.8768

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2402

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.8768

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2459

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.8768

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 3.9302

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.8337

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 4.5187

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.8337

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 4.053

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.8337

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 6.1381

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.8337

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.9245

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.694

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 4.2352

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 3.0118

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 10.667

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 3.0118

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 3.5032

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 3.0118
```

```
## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 4.0395

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 3.0118

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 11.032

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 3.0118

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 6.8933

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 7.2051

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 6.8933

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## -1.4692

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.3972

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## -1.4739
```

```
## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.3972

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.2213

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1803

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4812

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.1599

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 5.925

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.1599

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 3.9804

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.5019

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 8.8991

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.5019

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 7.7235

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.5019

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 4.9056

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.596

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 5.4251

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.596

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 4.0906

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5146

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.7152

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.319

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.9678

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.319

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.772

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.319

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 4.7667

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.4698

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438
```

```
## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.7499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 8.8991

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.0056

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 7.7235

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.0056

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 9.4537

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0831

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 7.8067

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0831

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 10.667

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 4.26

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 11.032

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 4.26

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 4.2836

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6585

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 9.058

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 6.8408

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.9633

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 4.5187

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.0795

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 6.1381

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.0795
```

```
## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 5.1084

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.3735

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.7092

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.411

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9726

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.411

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9068

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.411

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 4.5327

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.8772

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2402
```

```
## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.8772

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2459

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.8772

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4812

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.1602

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 5.925

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.1602

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 6.8536

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.4409

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 3.4712

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.4409

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.4409
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 5.3381
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.4409
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 7.2051
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.4409
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.4808

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0229

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.376

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.0909

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.6478

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.0909

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.3179

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.0909

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.1591

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0652

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.5315

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3731

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], : eval
## 4.2348

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## upperlimit 4.0649

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], : eval
## 4.2399

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## upperlimit 4.0649

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 4.6965

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.0184

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.8825

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.2377

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.4953

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.2377
```

```
## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.9245

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.5179

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.5791

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.5179

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.6693

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.5179

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 3.7665

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.4613

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 4.5658

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.4613

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 4.9056
```

```
## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.4613

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 5.4251

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.4613

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 4.5187

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.9561

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 4.053

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.9561

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 6.1381

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.9561

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## 3.9519
```

```
## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.7972
```

```
## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.4808
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0228
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.9678
```

```
## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.801
```

```
## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.1591

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0587

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.5315

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3731

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4052

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.2911

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 5.1084

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.3735

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9726

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.9362

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 6.8408
```

```
## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.9633

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 9.4537

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 7.8509

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 8.8991

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 7.7674

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## -1.2545

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.2523

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## -2.0816

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0743

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## 3.9519

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.797

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -1.848

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7122

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -1.724

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7122

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -1.713
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7122

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -1.7313

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7122

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.1763

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7122

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.1581

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7122

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.4808

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0204

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4052

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.2911

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 4.6965

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.3238

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 3.9919

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.3238

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## -1.4568

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.438

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 6.8408

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.9633

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 5.1084

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.3735

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## -1.2545

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.2523
```

```
## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## -2.0816

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0743

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## 3.9519

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.797
```

```
## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.4864

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.3815

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.4885

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.3815

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 4.0906

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.3815

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 4.7667

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.4657

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -3.1093

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.3089

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 3.3789
```

```
## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.2009

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 3.6318

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.2009

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 4.2836

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.2009

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.8825

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5238

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.6928

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 3.7395

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.6928

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 4.7168

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.6928

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4052

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.4749

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## 4.262

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.4749

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 11.032

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 10.724

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 9.058

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 5.1084

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.3735
```

```
## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 6.8408

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.9633

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## -1.4568

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.438

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 5.925

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5097

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 7.2466

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## 3.9519
```

```
## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.7972
```

```
## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.4808
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0229
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -3.1093
```

```
## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.3155
```

```
## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0279

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8554

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.7254

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.5959

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 4.0906

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5138

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.7499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.8825

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.2377

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.4953

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.2377
```

```
## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.6919

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5965

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 4.2836

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6578

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4052

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.2911

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## -1.4532

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.4098

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 4.6965

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.0184

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## -1.9828
```

```
## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8243

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], : eval
## 4.0392

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.6186

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], : eval
## 4.2348

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.6186

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], : eval
## 4.2399

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.6186

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.9245

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.694

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 4.9056

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.596

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 5.4251

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.596

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 9.0077

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.054

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.054

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 6.8536

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 5.3702

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 5.3702

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 7.2051

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 5.3702
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 11.032

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 10.724

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.2213

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1803

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4812

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.1599

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 5.925

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.1599

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## 3.9519

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.7972

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.4864

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.0197

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.3561

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.0197

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.4885

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.0197

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 4.0906

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.0197

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.6478

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.404

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.2105

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.6441

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.1227

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.6441

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.8825

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.6441
```

```
## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.4953

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.6441

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 3.1081

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.9855

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 3.3789

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.9855

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 3.1765

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.9855

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 3.6318

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.9855

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 4.2836
```

```
## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.9855

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 11.032

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 10.724

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 6.8408

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.9633

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval -1.341

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.3295

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 5.1084

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.3733

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 4.1018

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.9996

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4812

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.9996

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 4.1335

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.9996

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 5.925

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.9996

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0279

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8541

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.9678

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.743

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.772

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.743

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.7254

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.5959

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 4.0906

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5117

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.4808

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0229

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -1.9413

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7756

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -1.9692

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7756

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -1.9529

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7756

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.2273

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7756

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -1.9483

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7756
```

```
## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -1.8623

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7756

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0715

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7756

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## -1.8183

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.7836

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## -1.9828

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8404

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9726

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.7369

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9068
```

```
## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.7369

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## -1.5482

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.4874

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## -1.5041

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.4874

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## -1.5495

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.4874

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## -2.1456

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.9125

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## -2.222

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.9125

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.6919

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5952

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 3.6318

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.4036

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 4.2836

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.4036

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 4.5658

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.7926

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 4.9056

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.7926

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 5.4251

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.7926
```

```
## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## -1.4692

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.4154

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## -1.4739

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.4154

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## -1.4532

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.4063

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2402

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5622

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2459

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5622

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 3.9804
```

```
## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.2192

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 8.8991

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.2192

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 3.4792

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.2192

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 7.7235

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 3.2192

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.9245

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.6033

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.6693

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.6033

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 9.4537

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0831

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 7.8067

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0831

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.2213

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1821

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 5.925

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5094

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 4.2352

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 3.5243

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 10.667

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 3.5243
```

```
## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 4.0395

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 3.5243

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 11.032

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 3.5243

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.9678

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.801

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.7678

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 4.7168

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.7678

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.1591

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0587

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.3311

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3118

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 4.9499
```

```
## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.7586

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.5315

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3118

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 7.0657

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.7586

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9726

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.9362

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 9.4537

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 7.8507

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 9.058

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 8.8991

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 7.7674

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## -1.5482

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.5136

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## -1.5495

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.5136

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 7.2463

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## -1.096

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.0755

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## 4.5644

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.9476
```

```
## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## -1.4568
```

```
## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.438
```

```
## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.4808

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.4252
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.992

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.4252

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -2.2803

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.2105

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -3.1093

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.2105

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## 6.0407

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6899

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.1591

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0533

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## 4.1043
```

```
## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6899

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## 4.6442

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6899

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.6478

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.404

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## 4.9066

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## upperlimit 4.6997

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 4.9499

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.2482

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 4.7285

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.2482

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.5315

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3588

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 7.0657

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.2482

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 4.3233

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.2482

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 3.5797

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.383

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 4.9307

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.383

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 6.8408

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.383
```

```
## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## -1.4568

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.4175

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 5.1084

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.3735

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## -1.2155

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.1971

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## -1.2545

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.1971

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## 4.5644

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.9476

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 4.7667

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.4698

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0279

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8554

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.7254

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.5989

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## 6.0407

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.1356

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## 4.6442

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.1356

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## 4.9066

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## upperlimit 4.6997

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.6919

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5997

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.8825

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5238
```

```
## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## -1.9828

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8417

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 3.5797

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.383

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 4.9307

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.383

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 6.8408

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.383

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## -1.4532

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.4098

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 4.6965
```

```
## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.3238
```

```
## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 3.9919
```

```
## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.3238
```

```
## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 5.1084
```

```
## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.3735
```

```
## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.2213
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1893
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## -2.0816

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0753

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.7254

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.5989

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.4808

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.4253

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.992

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.4253

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0279
```

```
## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8554

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -3.1093

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.3155

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.7499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4052

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.2911

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 4.9499

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.7598

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## 7.0657

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.7598

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.6919

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5997

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 4.6965

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.0184

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## 4.5644

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.9476

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.9245

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.694

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 6.1381

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.5476

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 9.0077

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.054
```

```
## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.054

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## -1.4532

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.4098

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 4.5658

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.7926

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 4.9056

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.7926

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 5.4251

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.7926

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## -1.9828
```

```
## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8392

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 7.2466

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.2213

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1893

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## -2.0453

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.9841

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## -2.0816

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.9841

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.9678

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.801

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.2273

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -2.0972

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.376

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.0901

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.6478
```

```
## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.0901

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.3179

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.0901

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -2.2803

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.184

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -3.1093

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.184

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.7499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.0184

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.9613

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.1591

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.9613

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.0249

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.9613

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## -1.8183

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.7836

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.3311

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.2514

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.5315

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.2514

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.2817

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.2514
```

```
## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.2596

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.2514

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval -1.591

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5364

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval -1.6004

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5364

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval -1.5888

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5364

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## -2.222

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -2.1738

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.8825
```

```
## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5235

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 9.058

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 8.8991

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 7.7674

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9726

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.9362

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 9.4537

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 7.8509

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 6.8536

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 5.3703

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 5.3703

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 7.2051

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 5.3703

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval -1.341

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.3333

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## -1.4692

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.4154

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## -1.4739

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.4154

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## -2.0816

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0753

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.7254

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.542

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.5706

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.542

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0279

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8445

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## 6.0407

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.6775

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.1591

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0582

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.2273

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.9859
```

```
## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0715

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.9859

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.7499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.3311

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3235

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.5315

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3235

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## 4.9066

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## upperlimit 4.6995

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## -1.8183
```

```
## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8108

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## -1.9828

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8417

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 9.0077

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.054

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.054

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## -2.222

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -2.1757

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.6919

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5351

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.5705

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5351

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 4.6965

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.7847

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 3.9919

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.7847

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 3.3007

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.7847

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 3.0256

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.7847

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 3.0184

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.7847
```

```
## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 4.9307

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6056

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 6.8408

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6056

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval -1.341

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.324

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 5.1084

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.34

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 4.3451

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.34

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## -1.4532
```

```
## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.3858

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## -1.4568

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.438

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## -1.2545

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.2523

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.2213

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1602

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 6.8536

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.4409

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 3.4712

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.4409

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.4409

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 5.3381

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.4409

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 7.2051

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.4409

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## 3.9519

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.4187

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## 3.7679

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.4187

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.9678

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.744

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.772

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.744

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 4.0906

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5146

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 4.7667

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.4698

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.2273

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -2.1051

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.7499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## -2.1456

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.9125

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## -2.222

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.9125

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9726

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.7377
```

```
## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9068

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.7377

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 9.058

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 4.2836

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.6585

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 5.1084

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.3402

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval 4.3451

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.3402

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 9.4537
```

```
## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0831

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 7.8067

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0831

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2402

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5626

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2459

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5626

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval -0.72782

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : lowerlimit -0.71423

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval -0.72724

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : lowerlimit -0.71423

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval -0.72566

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : lowerlimit -0.71423

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 10.667

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 4.2598

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 11.032

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 4.2598

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 5.925

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5097

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval 6.8408

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.9633

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 8.8991

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.0056
```

```
## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 7.7235

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.0056

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 7.2466

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
```

```
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## 3.9519

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.7972

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0279

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8357

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.7254

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.4459

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.485

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.4459

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.4498

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.4459

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.5139

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.4459

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.4881

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.4459

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.5706

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.4459

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.6478

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.404

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.6919

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.4601

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.4636

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.4601
```

```
## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.5062

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.4601

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.4907

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.4601

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.5705

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.4601

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## -1.9828

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8417

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## -1.4532

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.3796

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], : eval
## 4.2348
```

```
## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## upperlimit 4.0649

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], : eval
## 4.2399

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## upperlimit 4.0649

## Warning in gam.lo(data[["lo(concavity_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 4.6965

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.0184

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], : eval
## 3.9245

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.694

## Warning in gam.lo(data[["lo(concave_pts_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## -1.2545

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.2523

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## -1.096

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.0629

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## -1.0751

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.0629

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.2213

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1099

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.1249

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1099

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.111

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1099

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.1539

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1099

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 5.4251

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.9374
```

```
## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -1.848

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7623

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.1763

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7623

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.1581
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.7623

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.7254

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.542

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## -1.5706

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.542

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0279

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.8445

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 4.7667

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.4698

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.1591

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0652

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 3.7395

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 4.7168

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 3.665

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 3.499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.5315

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3731

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.6919

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5351
```

```
## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## -1.5705

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5351

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## -1.9828

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8417

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 9.058

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 4.5187

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.0793

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## -1.2545

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.2419

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 6.1381
```

```
## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.0793

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## -1.4532

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.3858

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## -1.2213

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.1602

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 6.8536

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 5.3703

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 5.3703

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 7.2051

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 5.3703

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
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## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
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## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

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## lo.wam convergence not obtained in 30 iterations

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## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

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## lo.wam convergence not obtained in 30 iterations

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## lo.wam convergence not obtained in 30 iterations

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## lo.wam convergence not obtained in 30 iterations

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## lo.wam convergence not obtained in 30 iterations

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## lo.wam convergence not obtained in 30 iterations

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## lo.wam convergence not obtained in 30 iterations

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## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## 3.9519

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.7972

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## 4.7667

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.4698

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## 4.9066

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## upperlimit 4.6993

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## -1.8183

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.7824

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## eval 2.6835

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.6399

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## eval 2.6729

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.6399

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.3311

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3235

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.5315

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3235
```

```
## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## 6.0407

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.6775

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.1591

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0582

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## -1.5482

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.5337

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## -1.5495

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## lowerlimit -1.5337

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 4.5187

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.0795

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 6.1381
```

```
## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.0795
```

```
## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## -1.4568
```

```
## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.4339
```

```
## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
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## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

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## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## -2.0816
```

```
## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0753

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.9678

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.801

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.2273

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -2.0023

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.0715

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -2.0023

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.7499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## -1.8183

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.812

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## -2.1456

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.9105

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## -2.222

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.9105

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.8825

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5222

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 4.6965

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.0184

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9726

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.9362

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 9.0077

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.054
```

```
## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.054

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 8.8991

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 7.7674

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 9.4537

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 7.8509

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 7.2466

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 6.1381

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.5476

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## -2.0816

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.0753

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.4808

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0229

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, : eval
## 4.0906

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.5125

## Warning in gam.lo(data[["lo(radius_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.9678

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.744

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.772

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.744

## Warning in gam.lo(data[["lo(radius_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## 4.9066

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## upperlimit 4.6995

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], : eval
## -1.8183

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.8108

## Warning in gam.lo(data[["lo(fractal_dim_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.376

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.5068
```

```
## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 2.6576

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.5068

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.0645

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.5068

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 4.6478

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.5068

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 3.3179

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.5068

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, : eval
## 2.7506

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.5068

## Warning in gam.lo(data[["lo(texture_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], : eval
## -3.1093
```

```
## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -2.3155

## Warning in gam.lo(data[["lo(smoothness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## eval 2.6835

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.6399

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## eval 2.6729

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## upperlimit 2.6399

## Warning in gam.lo(data[["lo(concave_pts_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.0184

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.9543

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## 6.0407

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.677

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.1591

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.9543

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], : eval
## -2.0249

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.9543

## Warning in gam.lo(data[["lo(symmetry_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], : eval
## 6.6438

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.7499

## Warning in gam.lo(data[["lo(concave_pts_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.3311

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3012

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, : eval
## -1.5315

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.3012

## Warning in gam.lo(data[["lo(symmetry_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.2105

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.6556

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.1227

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.6556
```

```
## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.8825

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.6556

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, : eval
## 3.4953

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## upperlimit 2.6556

## Warning in gam.lo(data[["lo(texture_worst, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 9.0077

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.721

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 12.062

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.721

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, : eval
## 4.0286

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 3.721

## Warning in gam.lo(data[["lo(concavity_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 3.6318
```

```
## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.4042

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], : eval
## 4.2836

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## upperlimit 3.4042

## Warning in gam.lo(data[["lo(perimeter_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], : eval
## 4.6965

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## upperlimit 4.0184

## Warning in gam.lo(data[["lo(concavity_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval -1.591

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5364

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval -1.6004

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5364

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## eval -1.5888

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5364

## Warning in gam.lo(data[["lo(fractal_dim_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9726

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.7377

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], : eval
## 3.9068

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## upperlimit 3.7377

## Warning in gam.lo(data[["lo(perimeter_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 8.8991

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.0056

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, : eval
## 7.7235

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.0056

## Warning in gam.lo(data[["lo(radius_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## -1.0431

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.0254

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## -1.036

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.0254
```

```
## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 9.4537

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0829

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, : eval
## 7.8067

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 4.0829

## Warning in gam.lo(data[["lo(perimeter_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 10.667

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 4.26

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : eval 11.032

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : upperlimit 4.26

## Warning in gam.lo(data[["lo(area_se, span = 0.5, degree = 1)"]], z, w, span =
## 0.5, : extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2402

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5626

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, : eval
## 5.2459
```

```
## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.5626

## Warning in gam.lo(data[["lo(area_mean, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## 6.1381

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## upperlimit 4.5476

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## -1.4568

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.438

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], : eval
## 9.8429

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## upperlimit 7.2466

## Warning in gam.lo(data[["lo(fractal_dim_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 4.4812

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.1285

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 4.1335

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.1285

## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, : eval
## 5.925
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.1285
```

```
## Warning in gam.lo(data[["lo(area_worst, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations

## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, :
## lo.wam convergence not obtained in 30 iterations
```

```
loess_pred <- predict(loess_model, test_x)
```

```
## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## -2.2389

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.1118

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## -2.6803

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.1118

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], : eval
## -2.1145

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -2.1118

## Warning in gam.lo(data[["lo(smoothness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.3514

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -2.2096

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```
## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.2201

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -2.2096

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, : eval
## -2.7417

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## lowerlimit -2.2096

## Warning in gam.lo(data[["lo(symmetry_mean, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## 6.6494

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.435

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, : eval
## 4.8566

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## upperlimit 4.435

## Warning in gam.lo(data[["lo(texture_se, span = 0.5, degree = 1)"]], z, w, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval -1.3979

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.3733

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## eval -1.4426

## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## lowerlimit -1.3733
```

```
## Warning in gam.lo(data[["lo(compactness_worst, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## -1.6087

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5041

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], : eval
## -1.5318

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## lowerlimit -1.5041

## Warning in gam.lo(data[["lo(compactness_mean, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], : eval
## -1.297

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## lowerlimit -1.2915

## Warning in gam.lo(data[["lo(compactness_se, span = 0.5, degree = 1)"]], :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## -1.7745

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## lowerlimit -1.4912

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, : eval
## 8.0229

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## upperlimit 5.4595

## Warning in gam.lo(data[["lo(smoothness_se, span = 0.5, degree = 1)"]], z, :
## extrapolation not allowed with blending
```

```r
mean(loess_pred == test_y)
```

```
## [1] 0.983
```

Question 14: K-nearest neighbors Model

```r
set.seed(7, sample.kind = "Rounding")
```

```
## Warning in set.seed(7, sample.kind = "Rounding"): non-uniform 'Rounding' sampler
## used
```

```r
tuning <- data.frame(k = seq(3, 21, 2))
train_knn <- train(train_x, train_y,
      method = "knn",
      tuneGrid = tuning)
```

```
## Warning in (function (kind = NULL, normal.kind = NULL, sample.kind = NULL) :
## non-uniform 'Rounding' sampler used
```

```r
train_knn$bestTune
```

```
##    k
## 8 17
```

```r
knn_pred <- predict(train_knn, test_x)
mean(knn_pred == test_y)
```

```
## [1] 0.957
```

Question 15: Random Forest Model

```r
set.seed(9, sample.kind = "Rounding")
```

```
## Warning in set.seed(9, sample.kind = "Rounding"): non-uniform 'Rounding' sampler
## used
```

```r
rf_model <- train(x = train_x, y = train_y, method = "rf", tuneGrid = data.frame(mtry = c(3, 5, 7, 9)),
```

```
## Warning in (function (kind = NULL, normal.kind = NULL, sample.kind = NULL) :
## non-uniform 'Rounding' sampler used
```

```r
rf_pred <- predict(rf_model, test_x)
mean(rf_pred == test_y)
```

```
## [1] 0.974
```

```r
#most important variable in the random forest model
varImp(rf_model)
```

```
## rf variable importance
##
##   only 20 most important variables shown (out of 30)
##
##                    Importance
## area_worst              100.0
## radius_worst             87.7
## concave_pts_worst        85.7
## perimeter_worst          85.5
## concave_pts_mean         72.1
## area_se                  67.3
## concavity_worst          63.5
## area_mean                61.4
## texture_worst            59.9
## perimeter_mean           55.2
## concavity_mean           55.2
## texture_mean             55.0
## radius_se                49.8
## smoothness_worst         49.1
## radius_mean              49.0
## perimeter_se             45.0
## compactness_worst        39.3
## symmetry_worst           35.3
## smoothness_mean          30.6
## fractal_dim_worst        27.8
```

Consider the top 10 most important variables in the random forest model. Which set of features is most important for determining tumor type?

```r
varImp(rf_model)
```

```
## rf variable importance
##
##   only 20 most important variables shown (out of 30)
##
##                    Importance
## area_worst              100.0
## radius_worst             87.7
## concave_pts_worst        85.7
## perimeter_worst          85.5
## concave_pts_mean         72.1
## area_se                  67.3
## concavity_worst          63.5
## area_mean                61.4
## texture_worst            59.9
## perimeter_mean           55.2
## concavity_mean           55.2
## texture_mean             55.0
## radius_se                49.8
```

```
## smoothness_worst        49.1
## radius_mean             49.0
## perimeter_se            45.0
## compactness_worst       39.3
## symmetry_worst          35.3
## smoothness_mean         30.6
## fractal_dim_worst       27.8
```

worst is most important because 6 of the 10 values are worst values

Question 16a: Creating an Ensemble

```
predictions = data.frame(kmeans=kmeans_preds, logistic=logistic_pred, lda=lda_pred, qda=qda_pred, loess=

#alternate
y_hat <- ifelse(rowMeans(predictions == 'B') > 0.5, 'B', 'M')
mean(y_hat == test_y)
```

```
## [1] 0.983
```

```
final_pred <- apply(predictions, 1, function(row) {
  prob = mean(row == 'B')
  ifelse(prob > 0.5, 'B', 'M')
})

mean(final_pred == test_y)
```

```
## [1] 0.983
```

```
#alternate method
# ensemble <- cbind(glm = glm_preds == "B", lda = lda_preds == "B", qda = qda_preds == "B", loess = loe
#
# ensemble_preds <- ifelse(rowMeans(ensemble) > 0.5, "B", "M")
# mean(ensemble_preds == test_y)
```

Make a table of the accuracies of the 7 models and the accuracy of the ensemble model

```
predictions <- cbind(predictions, final_pred)

apply(predictions, 2, function(column) {
  mean(column == test_y)
})
```

```
##     kmeans   logistic        lda        qda      loess        knn         rf
##      0.922      0.957      0.991      0.957      0.983      0.957      0.974
## final_pred
##      0.983
```