R Function: Oto.Age.Model.fits (Bp.find = “T”)

### Description

Curve fitting function based on the R package Segmented. Includes options for data filtration, piecewise continuous and piecewise planar fitting, quadratic fitting, jittering, and one-to-one graphs. Also plots the corresponding fitted models.

### Usage

Oto.Age.Model.fits(spp.dat.in, oto.age.col = c(5,4,3), sextype = "All", Bp.find = "T",

rngSplit = list(c(10,200),c(10,200),c(10,200)), highbreaks = c(0,0,0), steppin = c(10,10,10), lowbreaks = c(0,0,0), pref.method = c(1,1,1), jitter = 0, one.to.one = "F", two.bp = "F",

quad.fit ="F", mod.select ="F", add.lengths ="F", comp.plot ="F", comp.num = list(c(1,1),c(1,1),c(1,1)))

### Arguments

**spp.dat.in** Unfiltered input data with columns corresponding to age, otolith weight, sex, and length (optional).

**oto.age.col** A vector of length 2 or 3 where the first element = column number for otolith weight data, the second element = column number for age, and the third element = column number for length data (optional).

**rngSplit** A list of three vectors that apply to sextype = “all”, “female”, “male” (in that order). Each vector is of length 2, and must bound the data set of its respective sextype. Used to find breakpoint(s) and to plot the quadratic fit on a separate graph (optional).

**highbreaks** A vector of length 3 that specifies the upper-end truncation of the data. Each element corresponds to the upper bound of “all”, “female” and “male” sextypes (in that order). Note: this argument only functions if mod.select = “T” (see below).

**lowbreaks** A vector of length 3 that specifies the lower-end truncation of the data. Functions similarly to the argument “highbreaks”. Note: this argument will always function, regardless of whether mod.select = “T”.

**pref.method** A vector of length 3 that specifies the preferred model to be jittered. Each element corresponds to the preferred model for “all”, “female” and

“male” sextypes (in that order). Element values range from 0 to 2, where the value describes the number of breakpoints in the model. Note: this argument is only intended for jitter != 0 (otherwise, it will replace the 1-bp model).

**jitter**  Integer. Used to specify the number of trials to be executed when testing a model for sensitivity to initial conditions.

**one.to.one** Logical. If one.to.one = “T”, the function will plot a one-to-one graph of the baseline model vs. the jittered model with the lowest AIC value. Note: this argument requires that jitter != 0.

**two.bp** Logical. If two.bp = “T”, the function will plot all of the desired models on a single plot. To designate a model as desired, its respective logical switch must be “T” (See arguments quad.fit and add.lengths).

**quad.fit** Logical. If quad.fit = “T”, the function will perform a quadratic regression on the data, and will plot the results separately. Note: if two.bp = “T”, the function will add the quadratic model to the collective plot of the desired models.

**mod.select** Logical. If mod.select = “T”, upper data truncation will occur. If mod.select = “F”, the upper breakpoint of the two breakpoint model will be printed (this is to determine how to truncate the data from above).

**add.lengths** Logical. if add.lengths = “T”, the function will fit two piecewise planar models to the data: a zero-breakline model, and a one-breakline model. Note: if two.bp = “T”, the function will add the two-dimensional analogue of these models to the collective plot of the desired models.

**comp.plot** Logical. if comp.plot = “T”, the function will plot a one-to-one graph of a designated two-dimensional model vs. a designated three-dimensional model. To designate which models to plot, use the comp.num argument (see below).

**comp.num** A list of length 3 with elements corresponding to the designated two-dimensional and three-dimensional models of “all”, “female” and “male” sextypes (in that order). Each element of the list is a vector of length 2 whose first element is the designated two-dimensional model for the given sextype, and whose second element is the designated three-dimensional model for the given sextype. Vector elements range from 0-2, where the element value denotes the number of breakpoints or breaklines.

### Values (stored objects)

**Dat.Bp.Lm.out** A list containing the following elements:

**lms** - contains the linear models for each sex.

**Min.jitter.lms** - contains the jitter models of each sex with the lowest AIC values. (only exists if the argument jitter != 0)

### Examples

Oto.Age.Model.fits(Petrale.dat.otos, oto.age.col = c(5,4,3), sextype = "All", Bp.find = "T", rngSplit = list(c(0,110),c(0,110),c(0,110),c(0,110)), steppin = c(0.1,0.1,0.1), lowbreaks = c(0,0,0), jitter = 0, one.to.one = "F", quad.fit = "T", two.bp = "T", add.lengths = "T")

Oto.Age.Model.fits(Petrale.dat.otos, oto.age.col = c(5,4,3), sextype = "All", Bp.find = "T" , rngSplit = list(c(0,110),c(0,110), c(0,110),c(0,110)), steppin = c(0.1,0.1,0.1), lowbreaks = c(0,0,0), highbreaks = c(130,130,130), jitter = 0, one.to.one = "F", two.bp = "T", quad.fit = "T", mod.select = "T", add.lengths = "T")

Oto.Age.Model.fits(Petrale.dat.otos, oto.age.col = c(5,4,3), sextype = "All", Bp.find = "T", rngSplit = list(c(0,110),c(0,110),c(0,110),c(0,110)), steppin = c(0.1,0.1,0.1), lowbreaks = c(0,0,0), highbreaks = c(130,130,130), jitter = 100, one.to.one = "T", two.bp = "F", quad.fit = "T", mod.select = "T", add.lengths = "T", comp.plot = "T", comp.num = list(c(1,0),c(1,1),c(1,0)))