Package ‘GenWin’

February 19, 2015

Title Spline Based Window Boundaries for Genomic Analyses
Version 0.1
Date 9/25/2014
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Description Defines window or bin boundaries for the analysis of genomic data. Boundaries are based on the inflection points of a cubic smoothing spline fitted to the raw data. Along with defining boundaries, a technique to evaluate results obtained from unequally-sized windows is provided. Applications are particularly pertinent for, though not limited to, genome scans for selection based on variability between populations (e.g. using Wright's fixation index, Fst, which measures variability in subpopulations relative to the total population).

Depends R (>= 3.1.1)
Imports pspline
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LazyData true
NeedsCompilation no
Repository CRAN
Date/Publication 2014-09-26 16:51:09

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### chr6  

#### Maize Fst Data

**Description**

Data from 85,388 SNPs on chromosome 6 of a maize, in a selection experiment involving 30 generations of selection for increased number of ears per plant. The variables are:

- **Chromosome.** Chromosome 6, always.
- **Position.** SNP position on maize reference version 2.
- **C0Freq.** Frequency of minor allele in cycle 0.
- **C30Freq.** Frequency of same allele in C30 (not necessarily minor).
- **Fst.** Fst value based on C0 and C30 frequencies.

**Usage**

```r
data(chr6)
```

**Format**

A data frame with 85,388 rows and 5 columns.

**References**


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### splineAnalyze  

#### Spline-based window analysis

**Description**

Defines window boundaries for analyzing genetic data and evaluates the specified windows.

**Usage**

```r
splineAnalyze(Y, map, smoothness = 100, s2 = NA, mean = NA, plotRaw = FALSE, plotWindows = FALSE, method = 3)
```
Arguments

- **Y**
  A vector of estimates of some parameter, such as Fst, computed at individual markers. One chromosome should be analyzed at a time.

- **map**
  A vector of positions for each marker with a corresponding parameter estimate.

- **smoothness**
  The level of resolution (in base pairs) for computing the spline and its derivatives.

- **s2**
  The variance of parameter estimates, to be used for computing Wstats. Default is to compute this automatically, but it may be manually specified, e.g. so that the value across chromosomes may be utilized.

- **mean**
  The mean of parameter estimates, to be used for computing Wstats. Default is to compute this automatically, but it may be manually specified, e.g. so that the value across chromosomes may be utilized.

- **plotRaw**
  Whether or not to produce a plot of raw data, with the fitted spline.

- **plotWindows**
  Whether or not to include a plot of Wstat values over the computed windows.

- **method**
  The method for controlling amount of smoothing: 1, 2, 3, or 4. See documentation of smooth.Pspline for description. Usual choices are either 3 for generalized cross validation or 4 for ordinary cross validation.

Value

- **rawSpline**
  The fitted spline object.

- **breaks**
  The spline-suggested window breaks.

- **windowData**
  A table of mean parameter estimates and Wstats computed over spline-suggested windows.

Examples

```r
data(chr6)
sub6 <- chr6[55000:63000,]
chr6Spline <- splineAnalyze(Y=sub6$Fst,map=sub6$Position,smoothness=100, plotRaw=TRUE,plotWindows=TRUE,method=4)
## Not run:
chr6Spline <- splineAnalyze(Y=chr6$Fst,map=chr6$Position,smoothness=100, plotRaw=TRUE,plotWindows=TRUE,method=4)
## End(Not run)
```
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