Package ‘GenomeGraphs’

November 21, 2016

Version 1.34.0
Title Plotting genomic information from Ensembl
Author Steffen Durinck <sdurinck@gmail.com>, James Bullard <bullard@berkeley.edu>
Maintainer Steffen Durinck <sdurinck@gmail.com>
Depends R (>= 2.10), methods, biomaRt, grid
biocViews Visualization, Microarray
Description Genomic data analyses requires integrated visualization of known genomic information and new experimental data. GenomeGraphs uses the biomaRt package to perform live annotation queries to Ensembl and translates this to e.g. gene/transcript structures in viewports of the grid graphics package. This results in genomic information plotted together with your data. Another strength of GenomeGraphs is to plot different data types such as array CGH, gene expression, sequencing and other data, together in one plot using the same genome coordinate system.
License Artistic-2.0
LazyLoad yes
NeedsCompilation no

R topics documented:

AnnotationTrack-class .................................................. 3
BaseTrack-class ......................................................... 3
cn ................................................................. 4
DisplayPars ............................................................... 5
DisplayPars-class ...................................................... 6
drawGD ................................................................. 7
drawTrackOverlay-methods ........................................... 7
ExonArray-class ......................................................... 8
exonProbePos ............................................................ 9
gdObject-class ......................................................... 9
gdPlot ................................................................. 10
Gene-class ............................................................. 11
geneBiomart ............................................................ 12
GeneModel-class ....................................................... 13
GeneRegion-class ...................................................... 14
### R topics documented:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>geneRegionBiomart</td>
<td>15</td>
</tr>
<tr>
<td>GenericArray-class</td>
<td>15</td>
</tr>
<tr>
<td>GenomeAxis-class</td>
<td>16</td>
</tr>
<tr>
<td>getGenomicRange</td>
<td>17</td>
</tr>
<tr>
<td>getPar</td>
<td>18</td>
</tr>
<tr>
<td>getSize</td>
<td>18</td>
</tr>
<tr>
<td>HighlightRegion-class</td>
<td>19</td>
</tr>
<tr>
<td>Ideogram-class</td>
<td>20</td>
</tr>
<tr>
<td>ideogramTab</td>
<td>21</td>
</tr>
<tr>
<td>ImplementsTrackOverlay-class</td>
<td>21</td>
</tr>
<tr>
<td>intensity</td>
<td>22</td>
</tr>
<tr>
<td>Legend-class</td>
<td>22</td>
</tr>
<tr>
<td>makeAnnotationTrack</td>
<td>23</td>
</tr>
<tr>
<td>makeBaseTrack</td>
<td>24</td>
</tr>
<tr>
<td>makeExonArray</td>
<td>25</td>
</tr>
<tr>
<td>makeGene</td>
<td>26</td>
</tr>
<tr>
<td>makeGeneModel</td>
<td>27</td>
</tr>
<tr>
<td>makeGeneRegion</td>
<td>28</td>
</tr>
<tr>
<td>makeGenericArray</td>
<td>29</td>
</tr>
<tr>
<td>makeGenomeAxis</td>
<td>30</td>
</tr>
<tr>
<td>makeIdeogram</td>
<td>31</td>
</tr>
<tr>
<td>makeLegend</td>
<td>32</td>
</tr>
<tr>
<td>makeRectangleOverlay</td>
<td>33</td>
</tr>
<tr>
<td>makeSegmentation</td>
<td>34</td>
</tr>
<tr>
<td>makeSmoothing</td>
<td>34</td>
</tr>
<tr>
<td>makeTextOverlay</td>
<td>35</td>
</tr>
<tr>
<td>makeTitle</td>
<td>36</td>
</tr>
<tr>
<td>makeTranscript</td>
<td>37</td>
</tr>
<tr>
<td>MappedRead-class</td>
<td>38</td>
</tr>
<tr>
<td>Overlay-class</td>
<td>38</td>
</tr>
<tr>
<td>probeStart</td>
<td>39</td>
</tr>
<tr>
<td>RectangleOverlay-class</td>
<td>39</td>
</tr>
<tr>
<td>segEnd</td>
<td>40</td>
</tr>
<tr>
<td>Segmentation-class</td>
<td>40</td>
</tr>
<tr>
<td>segments</td>
<td>41</td>
</tr>
<tr>
<td>segStart</td>
<td>41</td>
</tr>
<tr>
<td>seqDataEx</td>
<td>41</td>
</tr>
<tr>
<td>setPar</td>
<td>42</td>
</tr>
<tr>
<td>showDisplayOptions</td>
<td>42</td>
</tr>
<tr>
<td>Smoothing-class</td>
<td>43</td>
</tr>
<tr>
<td>TextOverlay-class</td>
<td>43</td>
</tr>
<tr>
<td>Title-class</td>
<td>44</td>
</tr>
<tr>
<td>TrackOverlay-class</td>
<td>45</td>
</tr>
<tr>
<td>Transcript-class</td>
<td>45</td>
</tr>
<tr>
<td>TranscriptRegion-class</td>
<td>46</td>
</tr>
<tr>
<td>unrData</td>
<td>47</td>
</tr>
<tr>
<td>unrNProbes</td>
<td>47</td>
</tr>
<tr>
<td>unrPositions</td>
<td>48</td>
</tr>
<tr>
<td>yeastCons1</td>
<td>48</td>
</tr>
</tbody>
</table>

### Index

49
AnnotationTrack-class

Class "AnnotationTrack"

Description

A generic object to store annotation

Objects from the Class

Objects can be created by calls of the form `new("AnnotationTrack", ...`).

Slots

- `chr`: Object of class "numeric"
- `strand`: Object of class "numeric"
- `regions`: Object of class "dfOrNULL"
- `dp`: Object of class "DisplayPars"

Extends

Class "gdObject", directly.

Methods

- `drawGD` signature(`gdObject = "AnnotationTrack"`): ...
- `getPlotId` signature(`obj = "AnnotationTrack"`): ...
- `initialize` signature(`.Object = "AnnotationTrack"`): ...

Author(s)

James Bullard

Examples

`showClass("AnnotationTrack")`

BaseTrack-class

Class "BaseTrack" represents base specific data

Description

Represents specific data, e.g. how many times was every base sequenced

Objects from the Class

Objects can be created by calls of the form `new("BaseTrack", ...`).
Slots

- base: Object of class "numeric". Is a vector of base positions
- value: Object of class "numeric". Is a vector of corresponding values for every base
- strand: Object of class "character" represents that DNA strand
- dp: Object of class DisplayPars to control various features of how the track is displayed.

Extends

Class "gdObject", directly.

Methods

- show signature(object = "BaseTrack"): ...

Author(s)

Steffen Durinck

References

http://www.stat.berkeley.edu/~steffen/

See Also

objects to See Also as gdPlot

Examples

```r
if (interactive()) {
  data("exampleData", package="GenomeGraphs")
  ga <- new("GenomeAxis")
  bt <- new("BaseTrack", base = yeastCons1[,1], value = yeastCons1[,2],
           dp = DisplayPars(color = "darkblue"))
  gdPlot(list(ga, bt))
}
```

---

** cn contains dummy copy number data

** Description

Contains dummy copy number data

** Examples

#
DisplayPars constructs objects of type DisplayPars which are used to effect the display of gdObjects

Description
DisplayPars takes any number of named arguments which will be used by the drawGD method of the gdObject. These arguments are analogous to both par and gp of the traditional and grid graphics systems respectively. Different functions support different graphical parameters - thus it is necessary to consult the documentation of the particular gdObject to determine which DisplayPars will be used.

Usage
DisplayPars(...)

Arguments
... name value pairs

Details
It is not recommended to call new("DisplayPars", ...) directly: rather this function DisplayPars() should be called instead. If a gdObject has already been instantiated then the appropriate method for changing graphical parameters is: setPar.

Value
Returns an object of type DisplayPars, generally this will be called during a call to the new function for a particular gdObject.

Author(s)
James Bullard

Examples
minbase = 10000
maxbase = 15000
mart <- useMart("ensembl", dataset = "scerevisiae_gene_ensembl")
genesplus <- new("GeneRegion", start = minbase, end = maxbase, biomart = mart,
                      strand = "+", chromosome = "I", dp = DisplayPars(color = "red"))
gaxis <- new("GenomeAxis", add53 = TRUE, add35 = TRUE)
genesminus <- new("GeneRegion", start = minbase, end = maxbase, biomart = mart,
                    strand = "-", chromosome = "I", dp = DisplayPars(color = "purple", size = 2))
title <- new("Title", title = "genes in a region")
gdPlot(list(genesplus, gaxis, genesminus, title), minbase, maxbase)
Class "DisplayPars" is used to specify graphical parameters to gdObjects.

Description

The DisplayPars functions analogously to par and gp. Generally the class is instantiated using the DisplayPars function rather than directly.

Objects from the Class

Objects can be created by calls of the form DisplayPars(...) rather than calls to: new("DisplayPars", ...) by calling the DisplayPars function directly in the constructor the gdObjects are guaranteed to have the appropriate defaults.

Slots

pars: Object of class "environment" Generally this slot is not accessed directly.

Methods

getPar signature(obj = "DisplayPars"): gets a graphical parameter by name
initialize signature(.Object = "DisplayPars"): This constructor should not be called directly.
setPar signature(obj = "DisplayPars"): sets a graphical parameter - see the example below.
Often it is easier to set the graphical parameter from within the gdObject.
show signature(object = "DisplayPars"): prints current graphical parameters

Warning

The DisplayPars class should not be manipulated directly. The preferred method for interacting with the class can be seen in the example below.

Author(s)

James Bullard

Examples

showClass("DisplayPars")

if (interactive()) {
  minbase = 10000
  maxbase = 15000
  mart <- useMart("ensembl", dataset = "scerevisiae_gene_ensembl")
  genesplus <- new("GeneRegion", start = minbase, end = maxbase, biomart = mart,
                    strand = "+", chromosome = "I", dp = DisplayPars(size = 2))
  ## plot it.
  gdPlot(list(genesplus, new("Title", title = "genes")), minbase, maxbase)
  ## to obtain a list of the current graphical parameters:
  print(genesplus@dp)
## to set a parameter:
setPar(genesplus, "protein_coding", "pink")
gdPlot(list(genesplus, new("Title", title = "genes")), minbase, maxbase)
}

---

drawGD

**Generic called on each gdObject to do the plotting.**

### Description
This generic gets called on each of the gdObjects (obviously the generic is implemented by a method for each object) and thus if a user wishes to implement new gdObjects they need to have access to this generic.

### Usage

drawGD(gdObject, minBase, maxBase, vpPosition, ...)

### Arguments
- **gdObject**
  gdObject list to plot
- **minBase**
  Minimum base position to plot
- **maxBase**
  Maximum base position to plot
- **vpPosition**
  vpPosition
- **...**
  Ignored

---

drawTrackOverlay-methods

*This method does the drawing of a track overlay. One should implement this method to gain track plotting functionality.*

### Description
Methods for function `drawTrackOverlay` in Package ‘GenomeGraphs’

### Methods
- **Segmentation**
- **Smoothing**
ExonArray-class

Class “ExonArray” representing probe level exon array data from Affymetrix

Description

Represents probe level exon array data from Affymetrix. Makes it possible to visualize alternative splicing as measured by the Affymetrix exon array platform and relate it to known transcript isoforms annotated by Ensembl.

Objects from the Class

Objects can be created by calls of the form `new("ExonArray", ...)`. 

Slots

- `intensity`: Object of class "matrix", array data matrix containing probes as the rows and samples as the columns
- `probeStart`: Object of class "numeric" vector with the start positions of the probes
- `probeEnd`: Object of class "numeric" vector with the end positions of the probes
- `probeId`: Object of class "character" vector containing the probeset identifiers
- `nProbes`: Object of class "numeric" vector defining how many probes there are for each exon/probeset
- `displayProbesets`: Object of class "logical" used to indicate if probe set names should be plotted or not

Extends

Class "gdObject", directly.

Methods

- `show` signature(object = "ExonArray"): ...

Author(s)

Steffen Durinck

References

http://www.stat.berkeley.edu/~steffen/

See Also

objects to See Also as `gdPlot`
Examples

```r
if(interactive()){
  data("unrData", package="GenomeGraphs")
  library(biomaRt)
  mart = useMart("ensembl", dataset="hsapiens_gene_ensembl")

  title = new("Title", title = "ENSG00000009307", dp = DisplayPars(color = "darkslategray"))
  exmapcol = rep("khaki", length(unrNProbes))
  exmapcol[28]="darkred"
  probeSetCol = rep("grey", length(unrNProbes))
  probeSetCol[27:28]="darkslategray"
  probeSetLwd = rep(1, length(unrNProbes))
  probeSetLwd[27:28]=3

  exon = new("ExonArray", intensity = unrData, probeStart = unrPositions[,3], probeEnd=unrPositions[,4],
             mapColor = exmapcol, probeSetColor = probeSetCol, probeSetLwd = probeSetLwd),
             displayProbesets=FALSE)
  exon2 = new("ExonArray", intensity = unrData, probeStart = unrPositions[,3], probeEnd=unrPositions[,4], probe

  affyModel = new("GeneModel", exonStart = unrPositions[,3], exonEnd = unrPositions[,4])
  gene = new("Gene", id = "ENSG00000009307", biomart = mart)
  transcript = new("Transcript", id = "ENSG00000009307", biomart = mart)
  legend = new("Legend", legend = c("affyModel","gene"), dp = DisplayPars(color= c("darkgreen","orange")))

  gdPlot(list(title, exonarray1 = exon, exonarray2= exon2, AffymetrixModel= affyModel, gene, transcript, legend))
}
```

exonProbePos

Contains dummy exon probe positions

Description

Contains dummy exon probe positions

Examples

```
```

gdObject-class

Class "gdObject" is the parent class of all of the objects in the system.

Description

The gdObject is the superclass of all the classes in the system and provides some basic functionality for displaying and managing graphical parameters.

Objects from the Class

Objects can be created by calls of the form new("gdObject", ...). Generally, this class is meant to be subclassed and not created directly.

Slots

dp: Object of class "DisplayPars" ~
Methods

**getCex** signature(obj = "gdObject"): ...
**getColor** signature(obj = "gdObject"): ...
**getLty** signature(obj = "gdObject"): ...
**getLwd** signature(obj = "gdObject"): ...
**getPar** signature(obj = "gdObject"): ...
**getPch** signature(obj = "gdObject"): ...
**getPointSize** signature(obj = "gdObject"): ...
**getSize** signature(obj = "gdObject"): ...
**initialize** signature(.Object = "gdObject"): ...
**setPar** signature(obj = "gdObject"): ...
**showDisplayOptions** signature(obj = "gdObject"): ...
**showDisplayOptions** signature(obj = "character"): ...

Author(s)

James Bullard

Examples

showClass("gdObject")

---

**gdPlot**  
*gdPlot is the main plotting function of the GenomeGraphs package*

Description

`gdPlot` is the main plotting function of the GenomeGraphs package. A collection of objects are given as a list and these will then be plotted in the order given.

Usage

`gdPlot(gdObjects, minBase = NA, maxBase = NA, overlays = NULL, labelColor = "black", labelCex = 1, labelRot = 90)`

Arguments

- **gdObjects**: This is either a list of `gdObjects` which will be plotted from top to bottom or a single `gdObject` to be plotted.
- **minBase**: `minBase` defines the minimum base that will be plotted, if omitted a minimum is determined from the objects in `gdObjects` if possible.
- **maxBase**: `maxBase` defines the maximum base that will be plotted, if omitted a minimum is determined from the objects in `gdObjects` if possible.
- **overlays**: `overlays` defines a set of regions to overlay on the plot. This argument is either a list or a single `Overlay` object.
- **labelColor**: `labelColor` Draw the labels with the given colors.
- **labelCex**: `labelCex` Character expansion factor.
- **labelRot**: `labelRot` Rotate the track labels `labelRot` degrees.
Gene-class

Author(s)
Steffen Durinck and James Bullard

References
http://www.stat.berkeley.edu/~steffen/

Examples

data("exampleData", package="GenomeGraphs")

minbase = min(probestart)
maxbase = max(probestart)

mart = useMart("ensembl", dataset="hsapiens_gene_ensembl")
genesplus = new("GeneRegion", start = minbase, end = maxbase, strand = "+", chromosome = "3", biomart=mart)
genesmin = new("GeneRegion", start = minbase, end = maxbase, strand = "-", chromosome = "3", biomart=mart)

seg <- new("Segmentation", segments = segments[[1]],
          segmentStart = segStart[[1]], segmentEnd = segEnd[[1]],
          dp = DisplayPars(color = "dodgerblue2", lwd=2, lty = "dashed"))

cop <- new("GenericArray", intensity = cn, probeStart = probestart,
           trackOverlay = seg, dp = DisplayPars(size=3, color = "seagreen", type="dot"))

ideog = new("Ideogram", chromosome = "3")
expres = new("GenericArray", intensity = intensity, probeStart = exonProbePos,
             dp = DisplayPars(color="darkred", type="point"))
genomeAxis = new("GenomeAxis", add53 = TRUE, add35=TRUE)
gdPlot(list(ideog, expres, cop, genesplus, genomeAxis, genesmin), minBase = minbase, maxBase = maxbase)

---

Gene-class

Class "Gene" represents the Ensembl Gene level annotation

Description
Class "Gene" represents the Ensembl Gene level annotation. Upon creation of an object of this class, intron and exon boundaries are retrieved from Ensembl

Objects from the Class
Objects can be created by calls of the form new("Gene", ...).

Slots
id: Object of class "character", representing a unique identifier for the gene or a vector of identifiers for genes that are located near each other (or at least on the same chromosome)
type: Object of class "character", representing the type of identifier used, e.g. hgnc\_symbol, entrezgene and ensembl\_gene\_id, check the listFilters function of the biomaRt package for more identifier options
geneBiomart

biomart: Object of class "Mart", contains the link to the Ensembl database and should be created using the useMart function from the bioMaRt package

ens: Object of class "data.frame", contains the output from the Ensembl query, users don’t need to give a value to this

Methods

initialize signature(.Object = "Gene"): ...
drawGD signature(.Object = "Gene"): ...
show signature(object = "Gene"): ...

Author(s)

Jim Bullard and Steffen Durinck

References

http://www.stat.berkeley.edu/~steffen/

See Also

objects to See Also as gdPlot

Examples

if(interactive()){
mart = useMart("ensembl", dataset="hsapiens_gene_ensembl")
gene = new("Gene", id = "ENSG00000095203", type="ensembl_gene_id", biomart = mart)
gdPlot(list(gene), minBase= 110974000, maxBase = 111122900)
}

geneBiomart AnnotationTrack objects from biomaRt

Description

Convenience function to construct an AnnotationTrack object from biomaRt.

Usage

geneBiomart(id, biomart, type = "ensembl_gene_id", dp = NULL)

Arguments

id Gene identifier
biomart Mart object connected to BioMart database, use useMart function to generate
type Type of identifier used, this should be a filter of the BioMart database e.g. ensembl_gene_id, hgnc_symbol
dp Display parameters
Description

This class represents a custom gene model defined by exon boundaries. An example of this class could be an Affymetrix gene model used to create the Affy Exon array.

Objects from the Class

Objects can be created by calls of the form `new("GeneModel", ...)`. 

Slots

- `exonStart`: Object of class "numeric", vector containing the start positions of the exons that are to be drawn.
- `exonEnd`: Object of class "numeric", vector containing the end positions of the exons that are to be drawn.
- `chromosome`: Object of class "numeric", chromosome name.
- `dp`: Object of class "DisplayPars", color of the exons and size of the exon model in the final plot.

Methods

No methods defined with class "GeneModel" in the signature.

Author(s)

Steffen Durinck

References

http://www.stat.berkeley.edu/~steffen/

See Also

objects to See Also as `gdPlot`

Examples

data("unrData", package="GenomeGraphs")
affyModel = new("GeneModel", exonStart = unrPositions[,3], exonEnd = unrPositions[,4])
gdPlot(list(affyModel), minBase = min(unrPositions[,3]), maxBase = max(unrPositions[,4]))
Class "GeneRegion", representing gene structures in a defined genomic region

Description

Given a start and end position and a chromosome name, all gene structures in this region will be retrieved from Ensembl upon creation of the object.

Objects from the Class

Objects can be created by calls of the form `new("GeneRegion", ...)`. 

Slots

- `start`: Object of class "numeric", start position
- `end`: Object of class "numeric", end position
- `chromosome`: Object of class "character", chromosome name
- `strand`: Object of class "character", represents the strand from which the gene structures should be retrieved. Value is either + or -
- `biomart`: Object of class "Mart", containing the link to the Ensembl database. This should be created by the `useMart` function from the `biomaRt` package
- `ens`: Object of class "data.frame", output of the `biomaRt` query, should not be used by users

Methods

```
drawGD signature(.Object = "GeneRegion")
initialize signature(.Object = "GeneRegion")
show signature(object = "GeneRegion")
```

Author(s)

Steffen Durinck

References

http://www.stat.berkeley.edu/~steffen/

See Also

objects to See Also as `gdPlot`

Examples

```r
if(interactive()){
  mart = useMart("ensembl", dataset="hsapiens_gene_ensembl")
  plusStrand = new("GeneRegion", chromosome = "17", start = 30450000, end = 30550000, strand = "+", biomart = mart)
  genomeAxis = new("GenomeAxis", add53=TRUE)
  gdPlot(list(genomeAxis, plusStrand), minBase = 30450000, maxBase = 30550000)
}
```
geneRegionBiomart

Construct an AnnotationTrack object from biomaRt.

**Description**

This function constructs an AnnotationTrack object from Biomart. It is a convenience function.

**Usage**

```r
geneRegionBiomart(chr, start, end, strand, biomart, dp = NULL, chrFunction = function(x) x, strandFunction = function(x) x)
```

**Arguments**

- `chr`: chr An integer
- `start`: start The start location
- `end`: end The end location
- `strand`: strand An integer -1, 0, 1
- `biomart`: biomart A mart
- `dp`: dp DisplayPars object
- `chrFunction`: chrFunction A function which takes chr and converts it into the correct representation for biomaRt. For instance yeast likes to have chromosomes as roman numerals so you can use as.roman here.
- `strandFunction`: strandFunction Analogous to chrFunction, but for strand. The internal representation of strand is -1, 0, 1 whereas biomaRt has different species dependent representations.

**Value**

An AnnotationTrack object.

**Author(s)**

James Bullard

---

**GenericArray-class**

Class "GenericArray", representing array data

**Description**

The Generic Array class is a class that can be used to create plots from array data such as microarrays and arrayCGH platforms. It can represent, the data as line plots or dot plots and segments can be included as well.

**Objects from the Class**

Objects can be created by calls of the form `new("GenericArray", ...)`. 

---
GenomeAxis-class

Slots

intensity: Object of class "matrix", matrix containing the intensities of expression or cgh data. Rows should be probes, columns samples

probeStart: Object of class "numeric", start position of the probes

probeEnd: Object of class "numeric", end position of the probes if available

Methods

show signature(object = "GenericArray"): ...

Author(s)

Steffen Durinck

References

http://www.stat.berkeley.edu/~steffen/

See Also

objects to See Also as gdPlot

Examples

if(interactive()){  
data("exampleData", package="GenomeGraphs")

minbase <- 180292097  
maxbase <- 180492096  
ideog <- new("Ideogram", chromosome = "3")

expres <- new("GenericArray", intensity = intensity,  
probeStart = exonProbePos,  

dp = DisplayPars(color="darkred", type="point")

gdPlot(list(ideog, expres), minBase = minbase, maxBase = maxbase)
}

GenomeAxis-class Class "GenomeAxis", representing a genomic coordinate axis

Description

Represents a genomic coordinate axis

Objects from the Class

Objects can be created by calls of the form new("GenomeAxis", ...).
getGenomicRange

Slots

add53: Object of class "logical", indicating if 5 to 3 prime direction needs to be plotted
add35: Object of class "logical", indicating if 3 to 5 prime direction needs to be plotted
dp: Object of class "DisplayPars", containing the display parameters such as size of the plot and color
littleTicks: Object of class "logical", indicating if the genome axis should be dense for improved locating of regions of interest.

Methods

No methods defined with class "GenomeAxis" in the signature.

Author(s)

Steffen Durinck

References

http://www.stat.berkeley.edu/~steffen/

See Also

objects to See Also as gdPlot

Examples

if(interactive()){
  mart = useMart("ensembl", dataset="hsapiens_gene_ensembl")
  genomeAxis = new("GenomeAxis", add53=TRUE)
  plusStrand = new("GeneRegion", chromosome = "17", start = 30450000, end = 30550000, strand = "+", biomart = mart)
  gdPlot(list(genomeAxis, plusStrand), minBase = 30450000, maxBase = 30550000)
}

---

getGenomicRange

Retrieves the genomic range of an object

Description

getGenomicRange returns the genomic range of an object

Methods

signature(obj = "BaseTrack") # to be added
signature(obj = "ExonArray") # to be added
signature(obj = "gdObject") # to be added
signature(obj = "Gene") # to be added
signature(obj = "GeneRegion") # to be added
signature(obj = "GenericArray") # to be added
signature(obj = "Transcript") # to be added
signature(obj = "TranscriptRegion") # to be added
getPar

Retrieves a display parameter from an object.

Description

Retrieves a display parameter from an object.

Usage

getPar(obj, name, ...)

Arguments

obj A gdObject or DisplayPars object.
name Name of parameter to return.
... Ignored

Examples

a <- new("GenomeAxis")
getPar(a, "size")

getSize

gets the size

Description

Gets the size display parameter

Usage

getSize(obj, ...)

Arguments

obj An object, usually a gdObject.
... Ignored

Examples

#to be added
Class "HighlightRegion" is used to highlight vertical blocks of genomic regions.

Description

HighlightRegion is used to highlight a genomic region of interest. The class offers the ability to highlight or block out regions of interest.

Objects from the Class

Objects can be created by calls of the form `new("HighlightRegion", ...)`. 

Slots

- `start`: Object of class "numeric" genomic start position.
- `end`: Object of class "numeric" genomic end position.
- `region`: Object of class "numericOrNull" start and end number of the tracks to be covered by the region. These start from the first track (top = 1) to the last track: `length(gdObjects)` in the call to `gdObject`
- `coords`: Object of class "character" can be either "genomic" or "absolute". If the coordinates are "absolute" then one can plot things using the coordinate space defined by: lower-left (0,0) upper-right (1,1). In this case, start = x0, end = x1 and then region = (y0, y1). See the examples for more details.
- `dp`: Object of class "DisplayPars" specifies the various display parameters.

Extends

Class "gdObject", directly.

Methods

No methods defined with class "HighlightRegion" in the signature.

Author(s)

James Bullard

Examples

```r
if (interactive()) {
  data("exampleData", package="GenomeGraphs")
  ga <- new("GenomeAxis")
  grF <- new("GeneRegion", start = 10000, end = 20000, chromosome = "I", strand = "+", biomart = yeastMart)
  grR <- new("GeneRegion", start = 10000, end = 20000, chromosome = "I", strand = "+", biomart = yeastMart)
  bt <- new("BaseTrack", base = yeastCons1[,1], value = yeastCons1[,2])
  hr1 <- new("HighlightRegion", start = 11000, end = 13000, dp = DisplayPars(alpha = 1, color = "red", lty = "dashed", lwd = 3))
  hr2 <- new("HighlightRegion", start = 15900, end = 16500)
  gdPlot(list(grF, ga, grR, bt), highlightRegions = list(hr1, hr2))
}
```
Description

An ideogram is a representation of a chromosome containing the banding pattern. Note that currently ideograms are only available for hsapiens.

Objects from the Class

Objects can be created by calls of the form `new("Ideogram", ...)`. 

Slots

- chromosome: Object of class "character", representing the chromosome that needs to be drawn. E.g. 3 if chromosome 3 needs to be drawn or Y for Y chromosome.
- dp: Object of class "DisplayPars", can be used to specify the size (default 1) of the ideogram in the final plot and to specify the highlighting color

Methods

No methods defined with class "Ideogram" in the signature.

Author(s)

Steffen Durinck

References

http://www.stat.berkeley.edu/~steffen/

See Also

objects to See Also as `gdPlot`

Examples

```r
if(interactive()){ 
data("exampleData", package="GenomeGraphs")

minbase <- 180292097
maxbase <- 180492096
ideog <- new("Ideogram", chromosome = "3")
expres <- new("GenericArray", intensity = intensity, probeStart = exonProbePos,
             dp = DisplayPars(color="darkred", type="point"))
gdPlot(list(ideog, expres), minBase = minbase, maxBase =maxbase)
}
```
ideogramTab

Contains info to plot ideograms

Description

Contains info to plot ideograms

Format

The format is: chr "ideogramTab"

Source

NCBI

Examples

data(ideogramTab)
## maybe str(ideogramTab); plot(ideogramTab) ...

ImplementsTrackOverlay-class

Class "ImplementsTrackOverlay"

Description

The interface to be implemented to overlay tracks.

Objects from the Class

This object should not be instantiated, but rather this class should be extended to implement a particular interface.

Slots

trackOverlay: Object of class "TrackOverlayOrNull"

Methods

No methods defined with class "ImplementsTrackOverlay" in the signature.

Examples

showClass("ImplementsTrackOverlay")
Legend-class

Description

Contains dummy intensity data

Examples

#

Legend-class

Class "Legend", represents a legend to add to a plot

Description

This class represents a legend

Objects from the Class

Objects can be created by calls of the form new("Legend", ...).

Slots

legend: Object of class "character", vector with names of the items in the legend
dp: Object of class "DisplayPars" size of the legend (size), the size of the font (cex) and the colors (color) of the legend

Methods

No methods defined with class "Legend" in the signature.

Author(s)

Steffen Durinck

References

http://www.stat.berkeley.edu/~steffen/

See Also

objects to See Also as gdPlot

Examples

showClass("Legend")
makeAnnotationTrack  

Create objects of class AnnotationTrack

Description

Convenience function for constructing objects of class AnnotationTrack.

Usage

makeAnnotationTrack(regions = NULL, chr = NULL, strand = NULL, start = NULL, end = NULL, feature = NULL, group = NULL, ID = NULL, dp = NULL)

Arguments

regions  
A dataframe with columns start, end, feature, group, ID. start and end delineate the boundaries of the boxes feature can be used to color the boxes. Group denotes linking so generally exons from a gene form a group. Finally, ID can be used to plot names on boxes.

chr  
The chromosome of the regions (can be ignored)

strand  
The strand of the regions (can be ignored)

start  
If regions is missing then we construct a dataframe from the remaining parameters.

dp  
DisplayPars, in this case we can create a mapping between feature and color. So lets say in the feature column you have: gene, transcript, gene, then in the dp you can say gene = 'blue' and transcript = 'green'

Value

Returns an object of class AnnotationTrack

Examples

a <- makeAnnotationTrack(start = c(10, 15, 25), end = c(12, 19, 31),
                             group = c(1,1,2), feature = c("gene", "gene", "tf"),
                             ID = paste("id", 1:3, sep = ""), dp = DisplayPars(gene = 'blue'))
gdPlot(a, minBase = 0, maxBase = 40)


**makeBaseTrack**

Creates an object of class `BaseTrack`

**Description**

Creates an object of class `BaseTrack`, which can represent many datasets containing a base given by a vector of positions and a corresponding vector with values for these base positions.

**Usage**

```r
makeBaseTrack(base, value, strand, trackOverlay, dp = NULL)
```

**Arguments**

- `base`: Numeric vector of base positions
- `value`: Numeric vector with values for these base positions
- `strand`: Character either + or - representing the strand
- `trackOverlay`: Object of class `TrackOverlay`, used when overlays are needed to be drawn
- `dp`: Object of class `DisplayPars` representing the display parameters of the plot

**Value**

Object of class `BaseTrack`

**Author(s)**

Jim Bullard and Steffen Durinck

**References**

~put references to the literature/web site here~

**See Also**

`DisplayPars`, `gdPlot`

**Examples**

```r
## Should be DIRECTLY executable !! ----
##-- ==> Define data, use random,  
##--or do help(data=index) for the standard data sets.

## The function is currently defined as
function (base, value, strand, segmentation, dp = NULL)
{
  pt <- getClass("BaseTrack")@prototype
  if (is.null(dp))
    dp <- pt@dp
  if (missing(strand))
    strand <- pt@strand
  if (missing(segmentation))
    segmentation <- pt@segmentation
```
makeExonArray

if (missing(base))
  stop("Need base argument to know the base positions to plot the data on the genome")
if (missing(value))
  stop("Need value argument")
new("BaseTrack", base = base, value = value, strand = strand,
   dp = dp, segmentation = segmentation)

makeExonArray
Creates an object of class ExonArray

Description

Creates an object of class ExonArray, representing exon array microarray data

Usage

makeExonArray(intensity, probeStart, probeEnd, probeId, nProbes, displayProbesets = FALSE, dp = NULL)

Arguments

intensity             Matrix of intensities, probes in the rows, samples in the columns
probeStart            Vector of probe start positions
probeEnd              Vector of probe end positions (optional)
probeId               Character vector containing the probe identifiers
nProbes               Vector indicating how many probes are in each probeset
displayProbesets      Logical indicating if the probeset identifier should be displayed or not
dp                     Object of class DisplayPars to set the display parameters

Value

Object of ExonArray class

Author(s)

Steffen Durinck and Jim Bullard

References

~put references to the literature/web site here ~

See Also

gdPlot
Examples

```r
# Should be DIRECTLY executable !! ----
#-- ==> Define data, use random,
#-- or do help(data=index) for the standard data sets.

# The function is currently defined as
function (intensity, probeStart, probeEnd, probeId, nProbes,
          displayProbesets = FALSE, dp = NULL)
{
  pt <- getClass("ExonArray")@prototype
  if (is.null(dp))
    dp <- pt@dp
  if (missing(probeEnd))
    probeEnd <- pt@probeEnd
  if (missing(probeId))
    probeId <- pt@probeId
  if (missing(nProbes))
    nProbes <- pt@nProbes
  if (is.null(dp))
    dp <- getClass("ExonArray")@prototype@dp
  new("ExonArray", intensity = intensity, probeStart = probeStart,
       probeEnd = probeEnd, probeId = probeId, nProbes = nProbes,
       displayProbesets = displayProbesets, dp = dp)
}
```

makeGene

Creates an object of class Gene

Description

Creates an object of class Gene. This represents a gene structure as annotated in Ensembl.

Usage

```r
makeGene(id, type, biomart, dp = NULL)
```

Arguments

- **id**: An identifier used to specify of which gene the intron-exon structure should be retrieved.
- **type**: The type of identifiers used, examples are ensembl\_gene\_id, hgnc\_symbol, entrezgene. See `listAttributes` function of the biomaRt package for more info.
- **biomart**: Mart object, created by the `useMart` function of biomaRt.
- **dp**: object of class DisplayPars, determines the display of features on the plot.

Value

An object of class Gene

Author(s)

Steffen Durinck and Jim Bullard
makeGeneModel

References
~put references to the literature/web site here ~

See Also
gdPlot

Examples
### Should be DIRECTLY executable !! ----
###-- ==> Define data, use random,
###--or do help(data=index) for the standard data sets.

## The function is currently defined as

```r
function (id, type, biomart, dp = NULL)
{
  if (missing(id))
    stop("Need to specify a gene identifier for creating a Gene")
  pt <- getClass("Gene")@prototype
  if (is.null(dp))
    dp <- pt@dp
  if (missing(type))
    type = pt@type
  new("Gene", id = id, type = type, biomart = biomart, dp = dp)
}
```

makeGeneModel *Creates an object of class GeneModel*

Description

Creates an object of class GeneModel representing a custom annotation or gene model

Usage

```r
makeGeneModel(start, end, chromosome, dp = NULL)
```

Arguments

- **start**: Vector of start positions for exons
- **end**: Vector of end positions for exons
- **chromosome**: chromosome name
- **dp**: Display parameters represented as an object of class DisplayPars

Value

Object of class GeneModel

Author(s)

Steffen Durinck and Jim Bullard
makeGeneRegion

Creates an object of class Gene containing the intron-exon structures of genes

Description

Creates an object of class Gene containing the intron-exon structures of genes. Given a start and end position, strand and chromosome, all the intron-exon structures of all genes laying in this region will be retrieved.

Usage

makeGeneRegion(start, end, chromosome, strand, biomart, dp = NULL)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>start</td>
<td>Start position on chromosome</td>
</tr>
<tr>
<td>end</td>
<td>End position on chromosome</td>
</tr>
<tr>
<td>chromosome</td>
<td>Chromosome name</td>
</tr>
<tr>
<td>strand</td>
<td>Strand either + or -</td>
</tr>
<tr>
<td>biomart</td>
<td>Mart object, created by the useMart function of biomaRt</td>
</tr>
<tr>
<td>dp</td>
<td>Object of class DisplayPars, determines the display of features on the plot</td>
</tr>
</tbody>
</table>

Value

An object of class Gene

Author(s)

Steffen Durinck and Jim Bullard
makeGenericArray

Creates an object of class GenericArray

Description

Creates an object of class Generic Array representing microarray data. This could be gene expression, array CGH, etc.

Usage

makeGenericArray(intensity, probeStart, probeEnd, trackOverlay, dp = NULL)

Arguments

- **intensity**: Matrix of intensities, probes in the rows, samples in the columns
- **probeStart**: Vector of start positions for the probes
- **probeEnd**: Vector of end positions for probes (optional)
- **trackOverlay**: Object of class TrackOverlay, needs to be added if overlays should be plotted as well
- **dp**: Object of class DisplayPars which handles the display parameters for plotting

Value

Object of class GenericArray
Author(s)

Jim Bullard and Steffen Durinck

References

BMC bioinformatics 2009

See Also

gdPlot

Examples

showClass("GenericArray")

makeGenomeAxis

Creates an object of class GenomeAxis

Description

Creates an object of class GenomeAxis, representing a genome coordinate axis.

Usage

makeGenomeAxis(add53 = FALSE, add35 = FALSE, littleTicks = FALSE, dp = NULL)

Arguments

add53 Add a 5 to 3 prime label
add35 Add a 3 to 5 prime label
littleTicks Add smaller ticks between larger ticks
dp Set the display parameters see DisplayPars

Value

Object of class GenomeAxis

Author(s)

Jim Bullard and Steffen Durinck

References

~put references to the literature/web site here ~

See Also

DisplayPars, gdPlot
makeIdeogram

Examples

```r
##---- Should be DIRECTLY executable !! ----
##-- ==> Define data, use random,
##-- or do help(data=index) for the standard data sets.

## The function is currently defined as
function (add53 = FALSE, add35 = FALSE, littleTicks = FALSE,
  dp = NULL)
{
  if (is.null(dp))
    dp <- getClass("GenomeAxis")@prototype@dp
  new("GenomeAxis", add53 = add53, add35 = add35, dp = dp)
}
```

makeIdeogram

*Creates object of class Ideogram*

Description

Creates object of class Ideogram

Usage

```r
makeIdeogram(chromosome, dp = NULL)
```

Arguments

- **chromosome**: Chromosome to represent (currently human only)
- **dp**: Display parameters such as color and size

Value

Object of class Ideogram

Author(s)

Jim Bullard and Steffen Durinck

References

~put references to the literature/web site here ~

See Also

```r
gdPlot```
makeLegend

Creates an object of class Legend

Description

Creates an object of class Legend which can be used to plot a legend

Usage

makeLegend(text, fill, cex)

Arguments

text Vector of characters representing the legend
fill Vector of colors to fill the legend boxes
cex Font size of the legend

Value

Object of class Legend

Author(s)

Jim Bullard and Steffen Durinck

References

~put references to the literature/web site here ~

See Also

See Also as gdPlot
**Examples**

```r
### Should be DIRECTLY executable !! ----
###-- ==> Define data, use random,
###--or do help(data=index) for the standard data sets.

## The function is currently defined as
function (text, fill, cex)
{
  dp <- getClass("Legend")@prototype@dp
  if (!missing(cex))
    setPar(dp, "cex", cex)
  if (!missing(fill))
    setPar(dp, "color", fill)
  new("Legend", legend = text, dp = dp)
}
```

`makeRectangleOverlay`  
Create a rectangular overlay

**Description**

Construct rectangular overlays.

**Usage**

```r
makeRectangleOverlay(start, end, region = NULL, coords = c("genomic", "absolute"), dp = NULL)
```

**Arguments**

- `start`: Start position in coords coordinates
- `end`: End position in coords coordinates
- `region`: Which tracks to span, or the y (vertical range)
- `coords`: Which coordinate system to use, if absolute then the range is from 0,1 and region become the y coordinates
- `dp`: The display parameters

**Details**

The rectangular overlay can be used to plot overlays in either genomic or absolute coordinates. If coordinates are absolute then the region argument becomes the y arguments.

**Value**

An object of class RectangleOverlay

**Examples**

```r
data("exampleData", package = "GenomeGraphs")
cop <- makeGenericArray(intensity = cn, probeStart = probestart,
  dp = DisplayPars(size=3, color = "seagreen", type="dot"))
gdPlot(list(makeGenomeAxis(), cop), overlays =
  makeRectangleOverlay(start = 180350000, end = 180350000 + 1e5, dp = DisplayPars(alpha = .3)))
```
makeSegmentation Create objects of class segmentation

Description

Construct objects of class segmentation

Usage

makeSegmentation(start, end, value, dp = NULL)

Arguments

- **start**: Either a list or a vector. If it is a list then it is a list of vectors of start position (this is the way it is represented in the segmentation class) If it is a vector it is a vector of start positions.
- **end**: Same as start, but the corresponding end positions.
- **value**: The y value of the segmentation, i.e. segments(start[i], value[i], end[i], value[i])
- **dp**: The Display parameters.

Value

An object of class Segmentation

Examples

data("exampleData", package="GenomeGraphs")
seg <- makeSegmentation(segStart[[1]], segEnd[[1]], segments[[1]],
                          dp = DisplayPars(color = "black", lwd=2,lty = "solid"))
cop <- makeGenericArray(intensity = cn, probeStart = probestart,
                         trackOverlay = seg, dp = DisplayPars(size=3, color = "seagreen", type="dot"))
gdPlot(cop)

makeSmoothing Create objects of class Smoothing

Description

Construct objects of class Smoothing

Usage

makeSmoothing(x, y, dp = NULL)

Arguments

- **x**: x-coordinate
- **y**: y-coordinate
- **dp**: The Display parameters.
makeTextOverlay

Create objects of class TextOverlay

Description
Create objects of class TextOverlay

Usage
makeTextOverlay(text, xpos, ypos, region = NULL, coords = c("genomic", "absolute"), dp = NULL)

Arguments
text The text to plot
xpos The xposition of the text
ypos The yposition of the text
region Region
coords Coordinates
dp The display parameters

Value
Returns class of TextOverlay

Examples
data("exampleData", package="GenomeGraphs")
seg <- makeSmoothing(probestart, lowess(probestart, cn)$y, dp = DisplayPars(color = "black", lwd=2, lty = "solid")
cop <- makeGenericArray(intensity = cn, probeStart = probestart,
  trackOverlay = seg, dp = DisplayPars(size=3, color = "seagreen", type="dot"))
gdPlot(cop, overlay = makeTextOverlay("Overlay Text", xpos = .5, ypos = .5, coords = "absolute"))
makeTitle

\textit{Creates an object of class Title}

\textbf{Description}

Creates an object of class Title which can be used to add a title to the plot

\textbf{Usage}

\makeTitle{\texttt{makeTitle(text, cex, color, size)}}

\textbf{Arguments}

\begin{description}
\item[\texttt{text}] The text that will make up the title
\item[\texttt{cex}] Font size of the title
\item[\texttt{color}] Font color of the title
\item[\texttt{size}] Size of the viewport in which the title resides
\end{description}

\textbf{Value}

Object of class Title

\textbf{Author(s)}

Steffen Durinck and Jim Bullard

\textbf{References}

~put references to the literature/web site here~

\textbf{See Also}

\gdPlot

\textbf{Examples}

\begin{verbatim}
##---- Should be DIRECTLY executable !! ----
##-- ==> Define data, use random,
##--or do help(data=index) for the standard data sets.

## The function is currently defined as
function (text, cex, color, size)
{
  dp <- getClass("Title")@prototype@dp
  if (!missing(cex))
    setPar(dp, "cex", cex)
  if (!missing(color))
    setPar(dp, "color", color)
  if (!missing(size))
    setPar(dp, "size", size)
  new("Title", title = text, dp = dp)
}
\end{verbatim}
makeTranscript

Creates an object of class Transcript

Description

Creates an object of class Transcript. This represents all known transcript structures in Ensembl.

Usage

makeTranscript(id, type, biomart, dp = NULL)

Arguments

id
An identifier used to specify which gene/transcript the transcript structures should be retrieved

Type
The type of identifiers used, examples are ensembl\_gene\_id, hgnc\_symbol,entrezgene. See listAttributes function of thebiomaRt package for more info

biomart
Mart object, created by the useMart function of biomaRt

dp
object of class DisplayPars, determines the display of features on the plot

Value

An object of class Transcript

Author(s)

Steffen Durinck and Jim Bullard

References

~put references to the literature/web site here ~

See Also

gdPlot

Examples

### Should be DIRECTLY executable !! ----
### => Define data, use random,
###---or do help(data=index) for the standard data sets.

## The function is currently defined as

function (id, type, biomart, dp = NULL)
{
  if (missing(id))
    stop("Need to specify a gene identifier for creating a Transcript")
  pt <- getClass("Transcript")@prototype
  if (is.null(dp))
    dp <- pt@dp
  if (missing(type))
    type = pt@type
new("Transcript", id = id, type = type, biomart = biomart, dp = dp)
}

## MappedRead-class

Represents mapped reads

### Description

Represents mapped reads

### Slots

- **start**: Object of class "numeric", containing start position of the reads
- **end**: Object of class "numeric", containing end position of the reads
- **strand**: Object of class "numeric", containing strand to which the reads map
- **chromosome**: Object of class "numeric", containing chromosome to which the reads map

### Methods

- **show** signature(object = "MappedRead"): ...

### Author(s)

Steffen Durinck

### References

http://www.stat.berkeley.edu/~steffen/

### Examples

```r
## maybe str(MappedRead) ; plot(MappedRead) ...
```

## Overlay-class

Class "Overlay"

### Description

Superclass of overlay objects.

### Objects from the Class

Objects from this class are generally not created.

### Slots

- **dp**: Object of class "DisplayPars"
Extends

Class "gdObject", directly.

Methods

No methods defined with class "Overlay" in the signature.

Examples

showClass("Overlay")

---

RectangleOverlay-class

Class "RectangleOverlay"

Description

Rectangular Overlay

Objects from the Class

Objects can be created by calls of the form makeRectangleOverlay (makeRectangleOverlay).

Slots

start: Object of class "numeric" ~
end: Object of class "numeric" ~
region: Object of class "numericOrNull" ~
coords: Object of class "character" ~
dp: Object of class "DisplayPars" ~

Extends

Class "Overlay", directly. Class "gdObject", by class "Overlay", distance 2.

Methods

drawOverlay signature(obj = "RectangleOverlay"): ...
Examples

showClass("RectangleOverlay")

### segEnd

Contains dummy copy number segmentation end positions

#### Description

Contains dummy copy number segmentation end positions

#### Examples

```
#
```

### Segmentation-class

Class "Segmentation" is used to specify segmentations to any class that extends Segmentable (GenericArray, BaseTrack)

#### Description

A Segmentation object provides line segments to various gdObjects

#### Objects from the Class

Objects can be created by calls of the form `new("Segmentation", segments = list(1), segmentStart = list(1000), segmentEnd = list(1010))`

#### Slots

- `segments`: Object of class "list"
- `segmentStart`: Object of class "list"
- `segmentEnd`: Object of class "list"
- `dp`: Object of class "DisplayPars"

#### Extends

Class "gdObject", directly.

#### Methods

- `getSegmentEnd` signature(obj = "Segmentation")
- `getSegmentStart` signature(obj = "Segmentation")
- `getSegments` signature(obj = "Segmentation")

#### Author(s)

James Bullard

#### Examples

```
showClass("Segmentation")
```
segments

Contains dummy copy number segment data

Description

Contains dummy copy number segment data

Examples

#

segStart

Contains dummy copy number segmentation start positions data

Description

Contains dummy copy number segmentation start positions

Examples

#

seqDataEx

This is an example data set from chromosome 4 of yeast from various publicly available datasets.

Description

This was a small dataset constructed from publicly available datasets. Please see references for details.

Usage

data(seqDataEx)

Format

data("seqDataEx", package = "GenomeGraphs") names(seqDataEx)

References

Ugrappa Nagalakshmi et. al. The transcriptional landscape of the yeast genome defined by RNA sequencing. Science, 2008
Adam Siepel, et. al. Evolutionarily conserved elements in vertebrate, insect, worm, and yeast genomes. Genome Res, 2005
Examples

data(seqDataEx)

dat

setPar

setPar(obj, name, val, ...)

Arguments

obj An object, usually a gdObject.
name Name of display parameter to set.
val Value of display parameter.
... Ignored

Examples

a <- new("GenomeAxis")
setPar(a, "size", 100)
gdPlot(a, minBase = 10, maxBase = 10000)

showDisplayOptions

showDisplayOptions(obj, ...)

Arguments

obj Either an object of subclass gdObject or a character naming a class
... Dots

Value

Returns a DisplayPars object which is generally printed to the screen.

Examples

showDisplayOptions("GenericArray")
**Smoothing-class**  
*Class "Smoothing"*

**Description**  
Simple object to overlay line segments specified by x,y coordinates.

**Objects from the Class**  
Objects can be created by calls of the form `makeSmoothing`.

**Slots**  
- `x`: Object of class "numeric"
- `y`: Object of class "numeric"
- `dp`: Object of class "DisplayPars"

**Extends**  
Class "TrackOverlay", directly. Class "gdObject", by class "TrackOverlay", distance 2. Class "TrackOverlayOrNull", by class "TrackOverlay", distance 2.

**Methods**  
No methods defined with class "Smoothing" in the signature.

**Examples**  
`showClass("Smoothing")`

---

**TextOverlay-class**  
*Class "TextOverlay"*

**Description**  
Textual overlay classes

**Objects from the Class**  
Objects can be created by calls of the form `makeTextOverlay`.

**Slots**  
- `text`: Object of class "character"
- `xpos`: Object of class "numeric"
- `ypos`: Object of class "numeric"
- `region`: Object of class "numericOrNull"
- `coords`: Object of class "character"
- `dp`: Object of class "DisplayPars"
Title-class

Extends

Class "Overlay", directly. Class "gdObject", by class "Overlay", distance 2.

Methods

drawOverlay signature(obj = "TextOverlay"): ...

Examples

showClass("TextOverlay")

Title-class

Class "Title" representing the title of a plot

Description

Represent the title of a plot

Objects from the Class

Objects can be created by calls of the form new("Title", ...).

Slots

title: Object of class "character" which will be used as title
dp: Object of class "DisplayPars" specifying the size and color of the title in the final plot

Methods

No methods defined with class "Title" in the signature.

Author(s)

Steffen Durinck

References

http://www.stat.berkeley.edu/~steffen/

See Also

objects to See Also as gdPlot

Examples

showClass("Title")
TrackOverlay-class

Class "TrackOverlay"

Description

Parent class for track overlay objects, such as Smoothing and Segmentation

Objects from the Class

Objects of this class are not instantiated, but rather this class should be extended.

Slots

dp: Object of class "DisplayPars" ~~

Extends

Class "gdObject", directly. Class "TrackOverlayOrNull", directly.

Methods

No methods defined with class "TrackOverlay" in the signature.

Examples

showClass("TrackOverlay")

Transcript-class

Represent known transcript isoforms as annotated by Ensembl

Description

Represent known transcript isoforms as annotated by Ensembl

Objects from the Class

Objects can be created by calls of the form new("Transcript", ...).

Slots

id: Object of class "character", represents the gene identifier that should be used to retrieve the transcript level annotation

type: Object of class "character", represents the type of identifiers used to specify the gene e.g. hgnc\_symbol, entrezgene and ensembl\_gene\_id

transcriptSize: Object of class "numeric", represents the size of the transcripts in the plot

numOfTranscripts: Object of class "numeric", should not be used by users

biomart: Object of class "Mart", containing the links to the Ensembl database. This object should be created with the useMart function of the biomaRt package

ens: Object of class "data.frame", should not be used by the users. Contains the output from the biomaRt query
Methods

drawGD signature(.Object = "Transcript"):
initialize signature(.Object = "Transcript"):
show signature(object = "Transcript"):

Author(s)

Steffen Durinck

References

http://www.stat.berkeley.edu/~steffen/

See Also

objects to See Also as gdPlot

Examples

if(interactive()){
  data("unrData", package="GenomeGraphs")
  mart = useMart("ensembl", dataset="hsapiens_gene_ensembl")
  transcript = new("Transcript", id = "ENSG00000009307", biomart = mart)
  gdPlot(list(transcript), minBase = min(exon@probeStart), maxBase=max(exon@probeEnd))
}

TranscriptRegion-class

Class "TranscriptRegion", representing a genomic region with transcripts

Description

Upon creation of this object, transcripts present in a specified region will be retrieved from Ensembl

Objects from the Class

Objects can be created by calls of the form new("TranscriptRegion", ...)

Slots

start: Object of class "numeric", the start base of the genomic region
end: Object of class "numeric", the end base of the genomic region
chromosome: Object of class "character", the chromosome
biomart: Object of class "Mart", contains link to Ensembl and should be created using the useMart function of the biomaRt package
ens: Object of class "data.frame", users should not specify this, it contains the output of the query to Ensembl
**unrData**

**Methods**

```
show signature(object = "TranscriptRegion"): ...
```

**Author(s)**

Steffen Durinck

**References**

http://www.stat.berkeley.edu/~steffen/

**See Also**

objects to See Also as `gdPlot`

**Examples**

```
showClass("TranscriptRegion")
```

---

**unrData**

*Contains exon array data*

**Description**

Contains exon array data from the publically available dataset on human tissue panels, given by Affymetrix. The data was contributed to the package by Elizabeth Purdom.

**Examples**

```
#
```

---

**unrNProbes**

*Contains exon array data*

**Description**

Contains the number of probes per exon array probeset id from the publically available dataset on human tissue panels, given by Affymetrix. The data was contributed to the package by Elizabeth Purdom.

**Examples**

```
#
```
<table>
<thead>
<tr>
<th>unrPositions</th>
<th>Contains probe start and end positions of exon array probes</th>
</tr>
</thead>
</table>

**Description**
Contains probe start and end positions from the publically available dataset on human tissue panels, given by Affymetrix. The data was contributed to the package by Elizabeth Purdom.

**Examples**
```
#
```

<table>
<thead>
<tr>
<th>yeastCons1</th>
<th>Contains dummy yeast conservation data</th>
</tr>
</thead>
</table>

**Description**
Contains dummy yeast base conservation data.

**Examples**
```
#
```
Index

*Topic **classes**
AnnotationTrack-class, 3
BaseTrack-class, 3
DisplayPars-class, 6
drawTrackOverlay-methods, 7
ExonArray-class, 8
gdObject-class, 9
Gene-class, 11
GeneModel-class, 13
GeneRegion-class, 14
GenericArray-class, 14
GenomeAxis-class, 16
HighlightRegion-class, 19
Ideogram-class, 20
ImplementsTrackOverlay-class, 21
Legend-class, 22
Overlay-class, 38
RectangleOverlay-class, 39
Segmentation-class, 40
Smoothing-class, 43
TextOverlay-class, 43
Title-class, 44
TrackOverlay-class, 45
Transcript-class, 45
TranscriptRegion-class, 46

*Topic **datasets**
cn, 4
exonProbePos, 9
ideogramTab, 21
intensity, 22
MappedRead-class, 38
probeStart, 39
segEnd, 40
segments, 41
segStart, 41
seqDataEx, 41
unrData, 47
unrNProbes, 47
unrPositions, 48
yeastCons1, 48

*Topic **hplot**
DisplayPars, 5
drawGD, 7
gdPlot, 10
geneBiomart, 12
geneRegionBiomart, 15
getPar, 18
getSize, 18
makeAnnotationTrack, 23
makeBaseTrack, 24
makeExonArray, 25
makeGene, 26
makeGeneModel, 27
makeGeneRegion, 28
makeGenericArray, 29
makeGenomeAxis, 30
makeIdeogram, 31
makeLegend, 32
makeRectangleOverlay, 33
makeSegmentation, 34
makeSmoothing, 34
makeTextOverlay, 35
makeTitle, 36
makeTranscript, 37
setPar, 42
showDisplayOptions, 42

*Topic **methods**
drawTrackOverlay-methods, 7
getGenomicRange, 17
AnnotationTrack-class, 3
BaseTrack-class, 3
cn, 4
DisplayPars, 5, 24, 28, 30
DisplayPars-class, 6
drawGD, 7
drawGD, AnnotationTrack-method (AnnotationTrack-class), 3
drawGD, BaseTrack-method (BaseTrack-class), 3
drawGD, ExonArray-method (ExonArray-class), 8
drawGD, Gene-method (Gene-class), 11
drawGD, GeneModel-method (GeneModel-class), 13
INDEX

drawGD, GeneRegion-method (GeneRegion-class), 14
drawGD, GenericArray-method (GenericArray-class), 15
drawGD, GenomeAxis-method (GenomeAxis-class), 16
drawGD, Ideogram-method (Ideogram-class), 20
drawGD, Legend-method (Legend-class), 22
drawGD, MappedRead-method (MappedRead-class), 38
drawGD, Segmentation-method (Segmentation-class), 40
drawGD, Transcript-method (Transcript-class), 45
drawOverlay, TextOverlay-method (TextOverlay-class), 43
drawOverlay, RectangleOverlay-method (RectangleOverlay-class), 39
drawTrackOverlay, Segmentation-method (drawTrackOverlay-methods), 7
drawTrackOverlay, Smoothing-method (drawTrackOverlay-methods), 7
drawTrackOverlay-methods, 7
ExonArray-class, 8
exonProbePos, 9
gdObject, 3, 4, 8, 19, 39, 40, 43–45
gdObject-class, 9
gdPlot, 4, 8, 10, 12–14, 16, 17, 20, 22, 24, 25, 27, 29–32, 36, 37, 44, 46, 47
Gene-class, 11
geneBiomart, 12
GeneModel-class, 13
GeneRegion-class, 14
geneRegionBiomart, 15
GenericArray-class, 15
GenomeAxis-class, 16
gxCex, gdObject-method (gdObject-class), 9
ggetColor, gdObject-method (gdObject-class), 9
getGenomicRange, GeneRegion-method (getGenomicRange), 17
getGenomicRange, GenericArray-method (getGenomicRange), 17
getGenomicRange, Transcript-method (getGenomicRange), 17
getGenomicRange, TranscriptRegion-method (getGenomicRange), 17
getLty, gdObject-method (gdObject-class), 9
getLwd, gdObject-method (gdObject-class), 9
getPar, 18
getPar, DisplayPars-method (DisplayPars-class), 6
getPar, gdObject-method (gdObject-class), 9
getPch, gdObject-method (gdObject-class), 9
getPlotId, AnnotationTrack-method (AnnotationTrack-class), 3
getPointSize, AnnotationTrack-method (AnnotationTrack-class), 3
gSetPar, 18
getSegmentEnd, Segmentation-method (Segmentation-class), 40
getSegments, Segmentation-method (Segmentation-class), 40
ggetSegmentStart, Segmentation-method (Segmentation-class), 40
getSize, 18
getSize, gdObject-method (gdObject-class), 9
HighlightRegion-class, 19
Ideogram-class, 20
ideogramTab, 21
ImplementsTrackOverlay-class, 21
initialize, AnnotationTrack-method (AnnotationTrack-class), 3
initialize, DisplayPars-method (DisplayPars-class), 6
initialize, gdObject-method (gdObject-class), 9
initialize, Gene-method (Gene-class), 11
initialize, GeneRegion-method (GeneRegion-class), 11
initialize, Transcript-method (Transcript-class), 45
intensity, 22
Legend-class, 22
makeAnnotationTrack, 23
INDEX

makeBaseTrack, 24
makeExonArray, 25
makeGene, 26
makeGeneModel, 27
makeGeneRegion, 28
makeGenericArray, 29
makeGenomeAxis, 30
makeIdeogram, 31
makeLegend, 32
makeRectangleOverlay, 33, 39
makeSegmentation, 34
makeSmoothing, 34
makeTextOverlay, 35, 43
makeTitle, 36
makeTranscript, 37
MappedRead-class, 38
Overlay, 39, 44
Overlay-class, 38
probestart, 39
RectangleOverlay-class, 39
segEnd, 40
Segmentation-class, 40
segments, 41
segStart, 41
seqDataEx, 41
setPar, 42
setPar, DisplayPars-method (DisplayPars-class), 6
setPar, gdObject-method (gdObject-class), 9
show, BaseTrack-method (BaseTrack-class), 3
show, DisplayPars-method (DisplayPars-class), 6
show, ExonArray-method (ExonArray-class), 8
show, Gene-method (Gene-class), 11
show, GeneRegion-method (GeneRegion-class), 14
show, GenericArray-method (GenericArray-class), 15
show, MappedRead-method (MappedRead-class), 38
show, Transcript-method (Transcript-class), 45
show, TranscriptRegion-method (TranscriptRegion-class), 46
showDisplayOptions, 42
showDisplayOptions, character-method (gdObject-class), 9
showDisplayOptions, gdObject-method (gdObject-class), 9
Smoothing-class, 43
TextOverlay-class, 43
Title-class, 44
TrackOverlay, 43
TrackOverlay-class, 45
Transcript-class, 45
TranscriptRegion-class, 46
unrData, 47
unrNProbes, 47
unrPositions, 48
yeastCons1, 48