Package ‘MultiDataSet’

March 23, 2017

Type Package

Title Implementation of the BRGE’s (Bioinformatic Research Group in Epidemiology from Center for Research in Environmental Epidemiology) MultiDataSet and MethylationSet

Version 1.2.0

Description Implementation of the BRGE’s (Bioinformatic Research Group in Epidemiology from Center for Research in Environmental Epidemiology) MultiDataSet and MethylationSet. MultiDataSet is designed for integrating multi omics data sets and MethylationSet to contain normalized methylation data.

These package contains base classes for MEAL and reposome packages.

License file LICENSE

LazyData TRUE

biocViews Software, DataRepresentation

Depends R (>= 3.3), Biobase

Imports BiocGenerics, GenomicRanges, IRanges, minfi, S4Vectors, SummarizedExperiment, methods, IlluminaHumanMethylation450kanno.ilmn12.hg19, utils

RoxygenNote 5.0.1

Suggests MEALData, minfiData, knitr, rmarkdown, testthat, methylumi, omicade4, iClusterPlus, GEOquery

VignetteBuilder knitr

NeedsCompilation no

Author Carlos Ruiz-Arenas [aut, cre], Carles Hernandez-Ferrer [aut], Juan R. Gonzalez [aut]

Maintainer Carlos Ruiz-Arenas <carlos.ruiz@isglobal.org>

R topics documented:

add_eset ................................................................. 2
add_genexp ............................................................. 3
add_methy .............................................................. 3
add_rnaseq ............................................................. 4
add_rse ................................................................. 5
add_eset

Method to add an eSet to MultiDataSet.

Description

This method adds or overwrites a slot of a MultiDataSet with the content of the given eSet.

Usage

```
add_eset(object, set, dataset.type, dataset.name = NULL, warnings = TRUE, overwrite = FALSE, GRanges)
```

Arguments

- **object**: MultiDataSet that will be filled.
- **set**: Object derived from eSet to be used to fill the slot.
- **dataset.type**: Character with the type of data of the omic set (e.g. expression, methylation...)
- **dataset.name**: Character with the specific name for this set (NULL by default). It is useful when there are several sets of the same type (e.g. multiple expression assays)
- **warnings**: Logical to indicate if warnings will be displayed.
- **overwrite**: Logical to indicate if the set stored in the slot will be overwritten.
- **GRanges**: GenomicRanges to be included in rowRanges slot.

Value

A new MultiDataSet with a slot filled.

See Also

add_methy, add_genexp, add_rnaseq, add_snps

Examples

```
multi <- createMultiDataSet()
eset <- new("ExpressionSet", exprs = matrix(runif(10), 5))
multi <- add_eset(multi, eset, "exampledata", GRanges = NA)
```
add_genexp

Method to add an expression microarray dataset to MultiDataSet.

Description
This method adds or overwrites the slot "expression" of an MultiDataSet with the content of the given ExpressionSet. The fData of the ExpressionSet must contain the columns chromosome, start and end.

Usage
add_genexp(object, gexpSet, ...)

Arguments
- object: MultiDataSet that will be filled.
- gexpSet: ExpressionSet to be used to fill the slot.
- ...: Arguments to be passed to add_eset.

Value
A new MultiDataSet with the slot "expression" filled.

Examples
```r
multi <- createMultiDataSet()
eset <- new("ExpressionSet", exprs = matrix(runif(4), 2))
fData(eset) <- data.frame(chromosome = c("chr1", "chr2"), start = c(12414, 1234321),
                        end = c(121241, 124124114), stringsAsFactors = FALSE)
multi <- add_genexp(multi, eset)
```

add_methy

Method to add a slot of methylation to MultiDataSet.

Description
This method adds or overwrites the slot "methylation" of an MultiDataSet with the content of the given MethylationSet or RatioSet. The fData of the input object must contain the columns chromosome and position.

Usage
add_methy(object, methySet, ...)

Arguments
- object: MultiDataSet that will be filled.
- methySet: MethylationSet or RatioSet to be used to fill the slot.
- ...: Further arguments to be passed to add_eset.
add_rnaseq

Value

A new MultiDataSet with the slot "methylation" filled.

Examples

```r
if (require(MEALData)){
  multi <- createMultiDataSet()
  betavals <- betavals[1:100, ]  ## To speed up the example, the beta values are reduced
  methy <- prepareMethylationSet(betavals, pheno)
  multi <- add_methy(multi, methy)
}
```

add_rnaseq

Method to add an expression RNA seq dataset to MultiDataSet.

Description

This method adds or overwrites the slot "rnaseq" of an MultiDataSet with the content of the given ExpressionSet. The fData of the ExpressionSet must contain the columns chromosome, start and end.

Usage

```r
add_rnaseq(object, rnaSet, ...)
```

Arguments

- object: MultiDataSet that will be filled.
- rnaSet: ExpressionSet to be used to fill the slot.
- ...: Arguments to be passed to add_eset.

Value

A new MultiDataSet with the slot "rnaseq" filled.

Examples

```r
multi <- createMultiDataSet()
eset <- new("ExpressionSet", exprs = matrix(runif(4), 2))
fData(eset) <- data.frame(chromosome = c("chr1", "chr2"), start = c(12414, 1234321),
                         end = c(121241, 12122414), stringsAsFactors = FALSE)
multi <- add_genexp(multi, eset)
```
Method to add a RangedSummarizedExperiment to MultiDataSet.

Description

This method adds or overwrites a slot of a MultiDataSet with the content of the given RangedSummarizedExperiment.

Usage

\[
\text{add}\_\text{rse}(\text{object, set, dataset.type, dataset.name = NULL, warnings = TRUE, overwrite = FALSE})
\]

Arguments

- **object** MultiDataSet that will be filled.
- **set** Object derived from RangedSummarizedExperiment to be used to fill the slot.
- **dataset.type** Character with the type of data of the omic set (e.g. expression, methylation...)
- **dataset.name** Character with the specific name for this set (NULL by default). It is useful when there are several sets of the same type (e.g. multiple expression assays)
- **warnings** Logical to indicate if warnings will be displayed.
- **overwrite** Logical to indicate if the set stored in the slot will be overwritten.

Value

A new MultiDataSet with a slot filled.

Examples

```r
if (require(GenomicRanges) & require(SummarizedExperiment)){
  multi <- createMultiDataSet()
  counts <- matrix(runif(200 * 6, 1, 1e4), 200)
  rowRanges <- GRanges(rep(c("chr1", "chr2"), c(50, 150)),
                          IRanges(floor(runif(200, 1e5, 1e6)), width=100),
                          strand=sample(c("+", "-"), 200, TRUE),
                          feature_id=sprintf("ID%03d", 1:200))
  colData <- DataFrame(Treatment=rep(c("ChIP", "Input"), 3),
                        row.names=LETTERS[1:6], id = LETTERS[1:6])
  names(rowRanges) <- 1:200
  rse <- SummarizedExperiment(assays=SimpleList(counts=counts),
                               rowRanges=rowRanges, colData=colData)
  multi <- add\_rse(multi, rse, "rseEx")
}
```
add_snps  
Method to add a slot of SNPs to MultiDataSet.

Description
This method adds or overwrites the slot "snps" of an MultiDataSet with the content of the given SnpSet. The fData of the SnpSet must contain the columns chromosome and position.

Usage
add_snps(object, snpSet, ...)

Arguments
object  MultiDataSet that will be filled.
snpSet  SnpSet to be used to fill the slot.
...  Arguments to be passed to add_eset.

Value
A new MultiDataSet with the slot "snps" filled.

Examples
```
multi <- createMultiDataSet()
geno <- matrix(c(3,1,2,1), ncol = 2)
colnames(geno) <- c("VAL0156", "VAL0372")
rownames(geno) <- c("rs3115860", "SNP1-1628854")
map <- AnnotatedDataFrame(data.frame(chromosome = c("chr1", "chr2"), position = c(12414, 1234321), stringsAsFactors = FALSE))
rownames(map) <- rownames(geno)
snpSet <- new("SnpSet", call = geno, featureData = map)
pheno <- data.frame(id = c("VAL0156", "VAL0372"))
rownames(pheno) <- c("VAL0156", "VAL0372")
pData(snpSet) <- pheno
multi <- add_snps(multi, snpSet)
```

checkProbes
Filter MethylationSet probes

Description
This function selects probes present in the annotation matrix. Probes without annotation and annotation values without beta values are discarded.

Usage
checkProbes(object)
checkSamples

Arguments

object MethylationSet

Value

MethylationSet containing the common samples.

Examples

if (require(MEALData)){
  betavals <- betavals[1:100, ]  # To speed up the example, the beta values are reduced
  methy <- prepareMethylationSet(betavals, pheno)
  checkSamples(methy)
}

checkSamples Modify a MethylationSet to only contain common samples

Description

This function removes samples that have beta values but no phenotypes and vice versa. If snps object is present, only samples present in the three set are retained.

Usage

checkSamples(object)

Arguments

object MethylationSet

Value

MethylationSet containing the common samples.

Examples

if (require(MEALData)){
  betavals <- betavals[1:100, ]  # To speed up the example, the beta values are reduced
  methy <- prepareMethylationSet(betavals, pheno)
  checkSamples(methy)
}
**chrNumToChar**  
*Convert chr numbers to chr strings*

**Description**
Given a vector of number representing the chromosomes, convert them to string (e.g 1 to chr1). 23 is consider chrX, 24 is chrY, 25 is chrXY (probes shared between chromosomes X and Y) and 26 is chrMT.

**Usage**
```r
chrNumToChar(vector)
```

**Arguments**
- `vector` The vector with the chromosome numbers

**Value**
A vector with the chromosomes in string format.

**Examples**
```r
cchromosomes <- c(1, 3, 4, 23, 15)
stringChrs <- chrNumToChar(chromosomes)
stringChrs
```

---

**commonIds**  
*Get the name of the ids common to all datasets*

**Description**
Get the name of the ids common to all datasets

**Usage**
```
ccommonIds(object)
```

**Arguments**
- `object` MultiDataSet that will be filtered.

**Value**
Character vector with the common ids.
commonSamples

Examples

multi <- createMultiDataSet()
eset <- new("ExpressionSet", exprs = matrix(runif(9), ncol = 3))
fData(eset) <- data.frame(chromosome = c("chr1", "chr1", "chr1"),
                         start = c(1, 5, 10), end = c(4, 6, 14),
                         stringsAsFactors = FALSE)
sampleNames(eset) <- c("S1", "S2", "S3")
pData(eset) <- data.frame(id = c("S1", "S2", "S3"))
rownames(pData(eset)) <- c("S1", "S2", "S3")
multi <- add_genexp(multi, eset, dataset.name = "g1")
eset <- new("ExpressionSet", exprs = matrix(runif(8), ncol = 2))
fData(eset) <- data.frame(chromosome = c("chr1", "chr1", "chr1", "chr1"),
                         start = c(1, 14, 25, 104), end = c(11, 16, 28, 115),
                         stringsAsFactors = FALSE)
sampleNames(eset) <- c("S1", "G2")
pData(eset) <- data.frame(id = c("S1", "G2"))
rownames(pData(eset)) <- c("S1", "G2")
multi <- add_genexp(multi, eset, dataset.name="g2")
commonIds(multi)

commonSamples

Method to select samples that are present in all datasets.

Description

This method subsets the datasets to only contain the samples that are in all datasets.

Usage

commonSamples(object)

Arguments

object MultiDataSet that will be filtered.

Value

A new MultiDataSet with only the common samples.

Examples

multi <- createMultiDataSet()
eset <- new("ExpressionSet", exprs = matrix(runif(9), ncol = 3))
fData(eset) <- data.frame(chromosome = c("chr1", "chr1", "chr1"),
                         start = c(1, 5, 10), end = c(4, 6, 14),
                         stringsAsFactors = FALSE)
sampleNames(eset) <- c("S1", "S2", "S3")
pData(eset) <- data.frame(id = c("S1", "S2", "S3"))
rownames(pData(eset)) <- c("S1", "S2", "S3")
multi <- add_genexp(multi, eset, dataset.name = "g1")
eset <- new("ExpressionSet", exprs = matrix(runif(8), ncol = 2))
MethylationSet

fData(eset) <- data.frame(chromosome = c("chr1", "chr1", "chr1", "chr1"),
                          start = c(1, 14, 25, 104), end = c(11, 16, 28, 115),
                          stringsAsFactors = FALSE)
sampleNames(eset) <- c("S1", "G2")
pData(eset) <- data.frame(id = c("S1", "G2"))
rownames(pData(eset)) <- c("S1", "G2")

multi <- add_genexp(multi, eset, dataset.name="g2")
commonSamples(multi)

getMs

Transforms beta values to M-values

Description

Given a MethylationSet or a AnalysisResults returns the matrix of M values using a logit2 transformation. Betas equal to 0 will be transformed to threshold and betas equal to 1, to 1 - threshold.

Usage

getMs(object, threshold = 1e-04)

Arguments

object MethylationSet or AnalysisResults
threshold Numeric with the threshold to avoid 0s and 1s.

Value

Matrix with the M values.

Examples

if (require(minfiData)){
  set <- prepareMethylationSet(MsetEx[1:100, ], pData(MsetEx))
  mvalues <- getMs(set)
  head(mvalues)
}

MethylationSet

MethylationSet instances

Description

Container with the data needed to perform methylation analysis. MethylationSet inherits from eSet and contains meth matrix as assay data member.
Usage

methylationSet(betas, phenotypes, annotationDataFrame, annoString = "custom")

## S4 method for signature 'MethylationSet'
betas(object)

## S4 method for signature 'MethylationSet'
getMs(object, threshold = 1e-04)

## S4 method for signature 'MethylationSet'
checkProbes(object)

## S4 method for signature 'MethylationSet'
checkSamples(object)

Arguments

betas Matrix of beta values
phenotypes Data.frame or AnnotatedDataFrame with the phenotypes
annotationDataFrame Data.frame or AnnotatedDataFrame with the phenotypes with the annotation of the methylation sites. A column with the chromosomes named chr and a column with the positions names pos are required.
annoString Character with the name of the annotation used.
object MethylationSet
threshold Numeric with the threshold to avoid 0s and 1s.

Details

FeatureData, which contains annotation data, is required to perform any of the analysis.

Value

MethylationSet

Methods (by generic)

• betas: Get beta matrix
• getMs: Get Ms values
• checkProbes: Filter probes with annotation
• checkSamples: Modify a MethylationSet to only contain common samples

Slots

assayData Contains matrices with equal dimensions, and with column number equal to nrow(phenoData). assayData must contain a matrix meth with rows representing features (e.g., methylation probes sets) and columns representing samples.
phenoData See eSet
annotation See eSet
featureData See eSet. fData should contain at least chromosome and positions columns.
Examples

showClass("MethylationSet")

---

Description

Implementation of the BRGE’s (Bioinformatic Research Group in Epidemiology from Center for Research in Environmental Epidemiology) MultiDataSet and MethylationSet. MultiDataSet is designed for integrating multi omics data sets and MethylationSet to contain normalized methylation data. MultiDataSet for integrating multi omics data sets

See Also

MultiDataSet

---

Description-class

MultiSet instances

Usage

## S4 method for signature 'MultiDataSet,eSet'
add_eset(object, set, dataset.type, 
dataset.name = NULL, warnings = TRUE, overwrite = FALSE, GRanges)

## S4 method for signature 'MultiDataSet,ExpressionSet'
add_genexp(object, gexpSet, ...)

## S4 method for signature 'MultiDataSet,ExpressionSet'
add_rnaseq(object, rnaSet, ...)

## S4 method for signature 'MultiDataSet,MethylationSet'
add_methy(object, methySet, ...)

## S4 method for signature 'MultiDataSet,RatioSet'
add_methy(object, methySet, ...)

## S4 method for signature 'MultiDataSet,RangedSummarizedExperiment'
add_rse(object, set, 
dataset.type, dataset.name = NULL, warnings = TRUE, overwrite = FALSE)

## S4 method for signature 'MultiDataSet,SnpSet'
add_snps(object, snpSet, ...)
## S4 method for signature 'MultiDataSet'
as.list(x)

## S4 method for signature 'MultiDataSet'
assayData(object)

## S4 method for signature 'MultiDataSet'
commonIds(object)

## S4 method for signature 'MultiDataSet'
commonSamples(object)

createMultiDataSet()

## S4 method for signature 'MultiDataSet'
fData(object)

## S4 method for signature 'MultiDataSet'
w_iclusterplus(object, commonSamples = TRUE, ...)

## S4 method for signature 'MultiDataSet'
length(x)

## S4 method for signature 'MultiDataSet'
w_mcia(object, ...)

## S4 method for signature 'MultiDataSet'
names(x)

## S4 method for signature 'MultiDataSet'
rowRangesElements(object)

## S4 method for signature 'MultiDataSet'
sampleNames(object)

## S4 method for signature 'MultiDataSet'
pData(object)

## S4 method for signature 'MultiDataSet'
rowRanges(x)

## S4 method for signature 'MultiDataSet,ANY,ANY'
x[[i]]

## S4 method for signature 'MultiDataSet,ANY,ANY,ANY'
x[i, j, k, ..., drop = FALSE]

## S4 method for signature 'MultiDataSet'
subset(x, feat, phe, warnings = TRUE, keep = TRUE)
Arguments

- **object**: `MultiDataSet`
- **set**: Object derived from `eSet` to be used to fill the slot.
- **dataset.type**: Character with the type of data of the omic set (e.g., expression, methylation...)
- **dataset.name**: Character with the specific name for this set (NULL by default). It is useful when there
- **warnings**: Logical to indicate if warnings will be displayed.
- **overwrite**: Logical to indicate if the set stored in the slot will be overwritten.
- **GRanges**: GenomicRanges to be included in rowRanges slot.
- **gexpSet**: ExpressionSet to be used to fill the slot.
- **...**: Further arguments passed to `add_eset`.
- **rnaSet**: ExpressionSet to be used to fill the slot.
- **methySet**: MethylationSet to be used to fill the slot.
- **snpSet**: SnpSet to be used to fill the slot.
- **x**: `MultiDataSet`
- **commonSamples**: Logical to indicate if common samples are selected
- **i**: Character corresponding to selected sample names. They should match the id column of phenoData.
- **j**: Character with the name of the selected tables.
- **k**: GenomicRange used to filter the features.
- **drop**: If TRUE, sets with no samples or features will be discarded
- **feat**: Logical expression indicating features to keep
- **phe**: Logical expression indicating the phenotype of the samples to keep
- **keep**: If FALSE, sets where the expression cannot be evaluated will be discarded.

Details

The names of the three lists (assayData, phenoData and featureData) must be the same.

Value

`MultiDataSet`

Methods (by generic)

- `add_eset`: Method to add an `eSet` to `MultiDataSet`.
- `add_genexp`: Method to add a slot of expression to `MultiDataSet`.
- `add_rnaseq`: Method to add a slot of (RNASeq) expression to `MultiDataSet`.
- `add_methy`: Method to add a slot of methylation to `MultiDataSet`.
- `add_rse`: Method to add a RangedSummarizedExperiment to `MultiDataSet`.
- `add_snps`: Method to add a slot of SNPs to `MultiDataSet`.
- `as.list`: Returns a list with the first matrix of each dataset.
- `assayData`: Retrieve all assay data blocks.
prepareMethylationSet

• commonIds: Get the name of the ids common to all datasets
• commonSamples: Get a MultiDataSet only with the samples present in all the tables
• fData: Retrieve information on features.
• w.iclusterplus: Apply iClusterPlus clustering method to a MultiDataSet object
• length: Returns the number of sets into the object.
• w.mcia: Apply mcia integration method to a MultiDataSet object
• names: Get the names of the slots.
• rowRangesElements: Get the name of the datasets that have rowRanges
• sampleNames: Get sample names
• pData: Retrieve information on experimental phenotypes.
• rowRanges: Retrieve information on feature ranges.
• [: Get a set from a slot
• [: Subset a MultiDataSet
• subset: Filter a subset using feature ids or phenotypes

Slots
assayData List of assayData elements.
phenoData List of AnnotatedDataFrame containing the phenoData of each assayData.
featureData List of AnnotatedDataFrame containing the featureData of each assayData.
rowRanges List of GenomicRanges containing the rowRanges of each assayData.
return_method List of functions used to create the original object.

See Also
add_eset, add_rse

Examples
createMultiDataSet()
prepareMethylationSet

Arguments

matrix
Data.frame or a matrix with samples on the columns and cpgs on the rows. A minfi object can be used to.

phenotypes
Data.frame or vector with the phenotypic features of the samples. Samples will be in the rows and variables in the columns. If matrix is a minfi object, phenotypes can be taken from it.

annotation
Character with the name of the annotation package or data.frame or AnnotationDataFrame with the annotation.

chromosome
Character with the column containing chromosome name in the annotation data.

genes
Character with the column containing gene names related to the methylation site in the annotation data. (Optional)

group
Character with the column containing the position of the probe related to the gene named in gene column. (Optional)

filterNA_threshold
Numeric with the maximum percentage of NA allowed for each of the probes. If 1, there will be no filtering, if 0 all probes containing at least a NA will be filtered.

verbose
Logical value. If TRUE, it writes out some messages indicating progress. If FALSE nothing should be printed.

Details

prepareMethylationSet is a useful wrapper to create MethylationSet. Right now, prepareMethylationSet supports two entry points: a minfi object and a matrix of betas.

Phenotypes are compulsory and can be supplied as data.frame or AnnotatedDataFrame.

By default, annotation is taken from minfi package and IlluminaHumanMethylation450kanno.ilmn12.hg19 package is used, being the default arguments adapted to use this annotation. To use this annotation, IlluminaHumanMethylation450kanno.ilmn12.hg19 must be installed and methylation sites must be named like in Illumina 450k chip. Use of this annotation ensures correct results in all the analysis.

If custom annotation is desired, there are two compulsory features: chromosomes and positions. Chromosomes should be supplied in the character form (e.g. chr1). Two additional features will be used during the presentation of results but not during the analyses: genes and group. Genes are the gene names of the genes around the cpg site and group defines the groups of the genes. Both columns will appear in the results but they are not used through the workflow. It should be noticed that BlockFinder only supports minfi annotation, so it is not advised to be used with custom annotation.

Value

MethylationSet with phenotypes and annotation.

Examples

if (require(minfiData)){
  betas <- getBeta(MsetEx)[1:1000, ]
  pheno <- pData(MsetEx)
  set <- prepareMethylationSet(betas, pheno)
}
rowRangesElements

Get the name of the datasets that have rowRanges

Description
Get the name of the datasets that have rowRanges

Usage
rowRangesElements(object)

Arguments
object MultiDataSet

Value
Character vector with the slots that have rowRanges.

Examples
multi <- createMultiDataSet()
eset <- new("ExpressionSet", exprs = matrix(runif(10), 5))
eset2 <- new("ExpressionSet", exprs = matrix(runif(8), ncol = 2))
fData(eset2) <- data.frame(chromosome = c("chr1", "chr1", "chr1", "chr1"),
                        start = c(1, 14, 25, 104),
                        end = c(11, 16, 28, 115),
                        stringsAsFactors = FALSE)
multi <- add_eset(multi, eset, "exampledata", GRanges = NA)
multi <- add_genexp(multi, eset2)
rowRangesElements(multi)

w_iclusterplus
Apply iClusterPlus clustering method to a MultiDataSet object

Description
Method iClusterPlus is applied on a MultiDataSet object after getting the common samples along
all the contained datasets.

Usage
w_iclusterplus(object, commonSamples = TRUE, ...)

Arguments
object MultiDataSet
commonSamples Logical to indicate if common samples are selected
... Arguments passed to function iClusterPlus
w_mcia

Value
A list of results from iClusterPlus

Note
Argument type for iClusterPlus is filled within the method.

Description
Method mcia is applied on a MultiDataSet object after getting the common samples along all the contained datasets.

Usage
w_mcia(object, ...)

Arguments
object MultiDataSet
... Arguments passed to function mcia

Value
A list of results from mcia
Index

[(MultiDataSet-class), 12
[MultiDataSet, ANY, ANY, ANY-method (MultiDataSet-class), 12
[[MultiDataSet, ANY, ANY-method (MultiDataSet-class), 12

add_eset, 2, 15
add_eset,MultiDataSet,eSet-method (MultiDataSet-class), 12

add_genexp, 2, 3
add_genexp,MultiDataSet,ExpressionSet-method (MultiDataSet-class), 12

add_methy, 2, 3
add_methy,MultiDataSet,MethylationSet-method (MultiDataSet-class), 12
add_methy,MultiDataSet,RatioSet-method (MultiDataSet-class), 12

add_rnaseq, 2, 4
add_rnaseq,MultiDataSet,ExpressionSet-method (MultiDataSet-class), 12

add_rse, 5, 15
add_rse,MultiDataSet,RangedSummarizedExperiment-method (MultiDataSet-class), 12

add_snps, 2, 6
add_snps,MultiDataSet,SnpSet-method (MultiDataSet-class), 12

as.list (MultiDataSet-class), 12
as.list,MultiDataSet-method (MultiDataSet-class), 12

assayData (MultiDataSet-class), 12
assayData,MultiDataSet-method (MultiDataSet-class), 12

betas (MethylationSet), 10
betas,MethylationSet-method (MethylationSet), 10

checkProbes, 6
checkProbes,MethylationSet-method (MethylationSet), 10

checkSamples, 7
checkSamples,MethylationSet-method (MethylationSet), 10

chrNumToChar, 8

commonIds, 8
commonIds,MultiDataSet-method (MultiDataSet-class), 12
commonSamples, 9
commonSamples,MultiDataSet-method (MultiDataSet-class), 12

createMultiDataSet (MultiDataSet-class), 12
eSet, 11

fData (MultiDataSet-class), 12
fData,MultiDataSet-method (MultiDataSet-class), 12

getMs, 10
getMs,MethylationSet-method (MethylationSet), 10

iClusterPlus, 17, 18

length (MultiDataSet-class), 12
length,MultiDataSet-method (MultiDataSet-class), 12

mcia, 18
MethylationSet, 10
methylationSet (MethylationSet), 10
MethylationSet-class (MethylationSet), 10
MethylationSet-methods (MethylationSet), 10

MultiDataSet, 12, 17, 18
MultiDataSet-class, 12

MultiDataSet-methods (MultiDataSet-class), 12
MultiDataSet-methods (MultiDataSet-class), 12
MultiDataSet-package (MultiDataSet-class), 12

names (MultiDataSet-class), 12
names,MultiDataSet-method (MultiDataSet-class), 12

pData (MultiDataSet-class), 12
pData, MultiDataSet-method (MultiDataSet-class), 12
prepareMethylationSet, 15
rowRanges (MultiDataSet-class), 12
rowRanges, MultiDataSet-method (MultiDataSet-class), 12
rowRangesElements, 17
rowRangesElements, MultiDataSet-method (MultiDataSet-class), 12
sampleNames, MultiDataSet-method (MultiDataSet-class), 12
subset, MultiDataSet-method (MultiDataSet-class), 12
w_iclusterplus, 17
w_iclusterplus, MultiDataSet-method (MultiDataSet-class), 12
w_mcia, 18
w_mcia, MultiDataSet-method (MultiDataSet-class), 12