Package ‘RefPlus’

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Type  Package
Title  A function set for the Extrapolation Strategy (RMA+) and Extrapolation Averaging (RMA++) methods.
Version  1.44.0
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Depends  R (>= 2.8.0), Biobase (>= 2.1.0), affy (>= 1.20.0), affyPLM (>= 1.18.0), preprocessCore (>= 1.4.0)
Suggests  affydata
Description  The package contains functions for pre-processing Affymetrix data using the RMA+ and the RMA++ methods.
License  GPL (>= 2)
biocViews  Microarray, OneChannel, Preprocessing
NeedsCompilation  no

R topics documented:

<table>
<thead>
<tr>
<th>RefPlus-package</th>
<th>RMA based on reference microarrays: RMA+ and RMA++ methods</th>
</tr>
</thead>
</table>

Description

RMA+ is an extension of the RMA algorithm that calculates the probeset intensities of a microarray using a pre-stored RMA model fitted on previously obtained microarrays, e.g. reference microarrays. RMA++ is a further extension based on the RMA+ method. This package depends on the affyPLM package.
Details

Package: RefPlus
Type: Package
Version: 1.13.2
Date: 2009-03-11
License: GPL version 2 or newer

Use rma.para to obtain the reference quantiles and the probe effects from a reference set, then use rmaplus to calculate the RMA+ intensities based on the fitted reference quantiles and probe effects.

Author(s)

By Kai-Ming Chang(kaiming@gmail.com)

References


Examples

if (require(affydata)) {
  ## Use Dilution in affydata package
  data(Dilution)

  ## Calculate RMA intensities using the rma function.
  Ex0<-.exprs(rma(Dilution))

  ## Background correct, estimate the probe effects, and calculate the
  ## RMA intensities using rma.para function.
  Para<-rma.para(Dilution, bg=TRUE, exp=TRUE)
  Ex1<-Para[[3]]

  ## Calculate the RMA+ intensity using rmaplus function.
  Ex2<-rmaplus(Dilution, rmapara=Para, bg = TRUE)
}

colMedians

Derive column medians of a numerical matrix

Description

Form column medians of a numerical array.

Usage

colMedians(mat)
**Arguments**

mat A numerical matrix.

**Details**

Form column medians of a numerical array.

**Value**

A vector of column medians is returned.

**Author(s)**

Kai-Ming Chang(kaiming@gmail.com)

**See Also**

rowQ

**Examples**

```r
A <- matrix(rnorm(30),10,3)
colMedians(A)
```

---

**normalize.quantiles2**   Reference quantile normalization

**Description**

Quantile normalization to a reference set.

**Usage**

`normalize.quantiles2(X, Reference.Quantiles)`

**Arguments**

X A matrix of probe intensity data to be reference quantile normalized.

Reference.Quantiles A vector of the reference quantiles that the probe intensities of a sample is normalized to.

**Details**

The function quantile normalized the probe intensities of a set of microarrays to a set of reference quantiles which are formed by a set of reference microarrays.

**Value**

The reference quantile normalized probe intensities.
**rma.para**

**Fitting a RMA model**

**Description**

Obtain reference quantiles and reference probe effects based on reference set `Train`, and calculate the gene expression

**Usage**

```r
rma.para(Train, bg = TRUE, exp = FALSE)
```

**Arguments**

- `Train`: An `AffyBatch` object of the reference set microarrays.
- `bg`: A logical flag. If `TRUE` (by default), background correct `Train` using default `bg.correct.rma`.
- `exp`: A logical flag. If `TRUE`, calculate the RMA measurements of `Train`. If `FALSE`, return 0.

**Value**

- `Reference.Quantiles`: Reference quantiles derived from `Train`.
- `probe.effects`: Estimated probe effects derived from `Train`.
- `expression`: RMA measurements of `Train`.

**Note**

The RMA procedure requires a lot of computer memory.
**rmaplus**

**Author(s)**
Kai-Ming Chang(kaiming@gmail.com)

**References**

**See Also**
- rmaplus, rmaref.predict

**Examples**
```r
if (require(affydata)) {
  ## Use Dilution in affydata package
data(Dilution)

  ## Background correct, estimate the probe effects, and calculate the
  ## RMA intensities using rma.para function.
  Ex<-rma.para(Dilution, bg=TRUE, exp=TRUE)

  ## Calculate the rma intensities using rma function.
  Ex0<-exprs(rma(Dilution))
  plot(Ex$express[,1],Ex0[,1])
}
```

---

**rmaplus  Derive RMA+ intensities**

**Description**
Calculate the RMA+ intensities using pre-stored reference quantiles and probe effects. The reference quantiles and the probe effects are the estimated parameter values from RMAing a set of microarrays (e.g. a reference set).

**Usage**
```r
rmaplus(Future, rmapara, r.q, p.e, bg = TRUE)
```

**Arguments**
- **Future**
  An affybatch object of the microarrays to be pre-processed using the RMA+ methods.
- **rmapara**
  Output of rma.para function that the contain reference quantiles and the reference probe effects.
- **r.q**
  The pre-stored vector of the quantiles that the probe intensity data of a microarray should be normalized to.
- **p.e**
  A pre-stored list of probe effects. It is a probe.coefs object of PLMset class in affyPLM package.
- **bg**
  A logical flag. If True (by default), background correct Train using default bg.correct.rma.
Value

The RMA+ intensities of Future.

Author(s)

Kai-Ming Chang(kaiming@gmail.com)

References


See Also

PLMset-class, rma.param, rmaref.predict

Examples

```r
if (require(affydata)) {
    ## Use Dilution in affydata package
    data(Dilution)

    ##Calculate RMA intensities using the rma function.
    Ex0<--exprs(rma(Dilution))

    ## Background correct, estimate the probe effects, and calculate the
    ## RMA intensities using rma.param function.
    Para<--rma.param(Dilution, bg=TRUE, exp=TRUE)
    Ex1<-Para[[3]]

    ## Calculate the RMA+ intensity using rmaplus function.
    Ex2<--rmaplus(Dilution, rmapara=Para, bg = TRUE)
}
```

```
rmaref.predict rmaref.predict

A function used by the rmaplus function

Description

Derive RMA+ expression. Used by rmaplus. The function does not background correct and normalize the probe-level data.

Usage

```
rmaref.predict(Future, p.e)
```

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Future</td>
<td>An affybatch object of the microarrays to be summarized by the RMA+ method.</td>
</tr>
<tr>
<td>p.e</td>
<td>The pre-stored list of the probe.effects. It is a probe.coefs object of PLMset class in affyPLM package.</td>
</tr>
</tbody>
</table>
**Value**

The RMA+ intensities of Future.

**Note**

Use the `rmaplus` function to normalize Future to pre-stored reference quantiles and correct the probe effects to obtain the RMA+ intensities.

**Author(s)**

Kai-Ming Chang(kaiming@gmail.com)

**References**


**See Also**

`PLMset-class`, `rma.para`, `rmaplus`
Index

*Topic manip
  colMedians, 2
  normalize.quantiles2, 3
  rma.para, 4
  rmaplus, 5
  rmaref.predict, 6

*Topic package
  RefPlus-package, 1

colMedians, 2

normalize.quantiles, 4
normalize.quantiles2, 3

RefPlus (RefPlus-package), 1
RefPlus-package, 1
rma.para, 4, 6, 7
rmaplus, 5, 5, 7
rmaref.predict, 5, 6, 6
rowQ, 3