Package 'FormalSeries'

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Type Package

Title Elementary arithemtic in formal series rings

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Description Implemented, addition, subtracking, multiplication, division in formal series rings of any number of variables (except division is only to 3 variables). Also are available ``[" ``[<-" operators.

Depends methods

License GPL-2

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`FormalSeries-package` *Elementary arithemtic in formal series rings*

Description

Implemented, addition, subtracking, multiplication, division in formal series rings of any number of variables (except division is only to 3 variables). Also are available "[", "[<-" operators.

Details

Package:	FormalSeries
Type:	Package
Version:	0.9
Date:	2012-02-17
License:	GPL-2
Depends:	methods

User can define formal series in object class S4 "fseries". Additionaly methods is generation random formal series by function "rfseries". Now user can operate on object class "fseries", may add, subtrack and divide two object "fseries" but also object "fseries" and "numeric". The most of operators have natural symbol but under "^" is implemented inversion. The number on the right side of "^" is the degree of inversion.

Author(s)

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See Also

`fseries` `rfseries`

Examples

```
a=rfseries(2,10,3,5) #random series
a[c(0,0)]=1 #now the formal series is invertible
#a=a+1 the second method
a&5 #compute inversion to X1^5 X2^5 expresion
```

`fseries-class` *Class* `"fseries"`

Description

Class of object from formal series ring of chosen number of variables.

Objects from the Class

Objects can be created by command `new("fseries", p, ap)`. This statement create formal series with coefficient matrix `ap` and matrix of exponents `p`. There can't be two same lines from matrix `p`. Zeros coefficients are deleted from matrix `ap` and their exponents from `p`. Name of matrix `p` and `ap` refer to notation of formal series as $\sum a_p X^p$, where $p = (p_1, \ldots, p_n)$ and n is number of variables.

Slots

`p`: Object of class `"matrix"`, matrix of exponents of variables

`ap`: Object of class `"matrix"`, coefficients matrix

`m`: Object of class `"matrix"`, sum of line of matrix `p`

Methods

- `signature(e1 = "fseries", e2 = "ANY")`

- `signature(e1 = "fseries", e2 = "fseries")`

- `signature(e1 = "fseries", e2 = "numeric")`

- `signature(e1 = "numeric", e2 = "fseries")`

***** `signature(e1 = "fseries", e2 = "fseries")`

***** `signature(e1 = "fseries", e2 = "numeric")`

***** `signature(e1 = "numeric", e2 = "fseries")`

/ `signature(e1 = "fseries", e2 = "fseries")`

/ `signature(e1 = "fseries", e2 = "numeric")`

/ `signature(e1 = "numeric", e2 = "fseries")`

[`signature(x = "fseries", i = "matrix")`

[`signature(x = "fseries", i = "numeric")`

[<- `signature(x = "fseries", i = "matrix", j = "missing", value = "matrix")`: ...

[<- `signature(x = "fseries", i = "numeric", j = "missing", value = "numeric")`: ...

& `signature(e1 = "fseries", e2 = "numeric")`

+ `signature(e1 = "fseries", e2 = "fseries")`

+ `signature(e1 = "fseries", e2 = "numeric")`

+ `signature(e1 = "numeric", e2 = "fseries")`

initialize `signature(.Object = "fseries")`

print `signature(x = "fseries")`

show `signature(object = "fseries")`

Author(s)

Tomasz Zmorzynski

See Also

rfseries

Examples

```
a=rfseries(2,10,3,5)
a[c(0,0)]=101
print(a)
a[c(0,0)]
```

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rfseries *Generation of random formal series*

Description

Generation of random formal series with coefficients and exponents of variables from uniform discrete distribution.

Usage

```
rfseries(var, cf, k, m)
```

Arguments

var	number of variables of formal series
cf	number of generating coefficients
k	the greater parameter in *U[0,k]* distribution
m	the greater parameter in *U[0,m]* distribution

Details

The exponents of variables are generate from discrete uniform distribution *U[0,k]*. The coefficients are from *U[0,m]* but additionally multiply by -1 or 1 with equal probability.

Author(s)

Tomasz Zmorzynski

See Also

fseries

Examples

```
rfseries(2,10,3,5) #random formal series of 2 variables with exponents from U[0,3] distribution,
   #10 coefficients from U[0,5] distribution
```

`rfseries-methods` *Methods for Function* `rfseries`

Description

Generate random formal series rfseries

Methods

`signature(var = "numeric", cf = "numeric", k = "numeric", m = "numeric")` Method is describe in documentation of rfseries function

See Also

`rfseries`

`&-methods` *Inversion of formal series*

Description

&-operator compute inversion of formal series $\sum a_p X^p$, where $p = (p_1, \ldots, p_n)$. The condition of invertible of formal series is $a_0 \neq 0$. If the condition is not fulfilled than error occurs. The numeric argument of this operation response for maximum exponent of inversion. In example, `a^5` for 2 variables, in this case the highest exponent of inversion of `a` is (5,5).

Methods

`signature(e1 = "fseries", e2 = "numeric")`

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