Basic arithmetic functions

FUNCTION →

```
log2(VAR) # logarithms base 2 of x

log10(VAR) # logaritms base 10 of x

exp(VAR) # Exponential of x

cos(VAR) # Cosine of x

sin(VAR) # Sine of x

tan(VAR) #Tangent of x

acos(VAR) # arc-cosine of x

asin(VAR) # arc-sine of x

atan(VAR) #arc-tangent of x

abs(VAR) # absolute value of x

sqrt(VAR) # square root of x
```

STAT_FUNCTION →

```
max(VAR)

min(VAR)

range(VAR)

length(VAR)

sum(VAR)

prod(VAR)

mean(VAR)

sd(VAR) # Standard deviation

var(VAR)

sort(VAR)
```

Assigning values to variables

VARS → VAR
| VAR,VAR
VAR → CHARACTER COMB
| ._COMB
| .CHARACTER COMB

COMB → . | _
| CHARACTER
| D
| COMB COMB
| *eps*

/*
- *VAL →* *VECTOR # to add at the end*

*/

A → VAR ASSIGN EXP
ASSIGN → <- | =

PRINT → VAR | print(VAR)
LIST → ls()
REMOVE → rm(VARS)

Basic data types

BASIC_TYPE → LOGICAL
| NUMERIC
| STRING
| COMPLEX

COMPLEX → Di

LOGICAL → TRUE
| FALSE
| T
| F

NUMERIC → INTEGER | DOUBLE
INTEGER → DL
| DedL
| -DL
| -DedL
| +DL
| +DedL
d → 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
D → dD
| d
DOUBLE → D | .D | D.D | D.Ded
| +D | +.D | +D.D | +D.Ded
| -D | -.D | -D.D | -D.Ded

STRING → “CHAINE”
| ‘CHAINE’
CHAINE → CHARACTER CHAINE
| CHAINE\’CHARACTER
| CHAINE\”CHARACTER
|CHARACTER
CHARACTER → a | b | c ... | z | A | ... | Z

TYPE → typeof(BASIC_TYPE)
| typeof(VAR) | class(VAR)

TEST_TYPE → is.numeric(VAR)
| is.character(VAR)

| is.logical(VAR) | is.complex(VAR)

CONVERT → as.numeric(VAR)
| as.character(VAR)
| as.logical(VAR)

/*
* Conversion d'un string to numeric est possible : returns NA (not available)
*/

Vectors

VECTOR → c(CL)
| c(CN)
| c(CS)
| c(CL)
| c(CV)
| c(CS,CN,TL)
| c(CS,CN)
| c(TS,TL)
| c(CN,CL)
| c(CNAMED)

CNAMED → CNAMED_N
| CNAMED_L
| CNAMED _S

CNAMED_N → CHAINE = NA
| CHAINE = NUMERIC
| CHAINE = NUMERIC , CNAMED_N
| CHAINE = NA, CNAMED_N

CNAMED_L → CHAINE = NA

| CHAINE = LOGICAL
| CHAINE = LOGICAL , CNAMED_L
| CHAINE = NA, CNAMED_L

CNAMED_S → CHAINE = NA
| CHAINE = STRING
| CHAINE = STRING , CNAMED_S
| CHAINE = NA, CNAMED_S

CHECK_NA → is.na(VAR)
CHECK_NAN → is.nan(VAR)

CV → VECTOR,CV
| VECTOR
CL → LOGICAL,CL
| LOGICAL
CN → NUMERIC,CN
| NUMERIC
CS → STRING,CS
| STRING

ELEMENT_NAMES → names(VAR) |
LENGTH → length(VAR)

SUBSET_VECTOR → var[D]
| var[D:D]
| var[c(D,D)]
| var[STRING]

EXCLUDE_ELEMENT → var[-D]
| var[-c(D,D)]
| VAR [-(D:D)]

SELECT_ELEMENT → var[var LOG_OP BASIC_TYPE]
| var [!CHECK_NA]

LOG_OP → ==
| !=
| >=
| <=
| <
| >

Matrices

VECTORS → VECTOR
| VECTOR,VECTORS

CREATE_MATRIX → rbind(VARS)
| rbind(VECTORS)
| cbind(VARS)
| cbind(VECTORS)
c for column and r for row
| matrix(data = VECTOR ,nrow = D , ncol = D , byrow = LOGICAL , dimnames = list(VECTORS))

RENAME → rownames(VAR)
| colnames(VAR)

TRANSPOSE → t(VAR)

DIMENSION → ncol(VAR)
| nrow(VAR)
| dim(VAR)

SUBSET_MATRIX → VAR[D,D]
| VAR[D,]
| VAR[D:D,]
| VAR[D:D,D:D]

| VAR[VECTOR,]
| VAR[,D]
| VAR[,D:D]
| VAR[,VECTOR]
| VAR[VECTOR,VECTOR]

SELECT → VAR[D,D]
| VAR[D,]
| VAR[,D]
| VAR[STRING,STRING]
| VAR[STRING,]
| VAR[,STRING] VAR[STRING,D]
| VAR[D,STRING]
| VAR[VAR LOG_OP BASIC_TYPE,]
| VAR[VAR LOG_OP BASIC_TYPE,VAR LOG_OP BASIC_TYPE]
| VAR[,VAR LOG_OP BASIC_TYPE]

EXCLUDE → VAR[-D,-D]
| VAR[-D,]
| VAR[,-D]

SPEC_MATRIX_FUNCTION → rowSums(VAR)
| colSums(VAR)
| colMeans(VAR)
|rowMeans(VAR)
| apply(VAR,1,STAT_FUNCTION)
|apply(VAR,2,STAT_FUNCTION)

Factors

CREATE_FACTOR → factor(VECTOR)
| factor(VAR,levels = VECTOR)
| factor(VAR)

CHECK_FACTOR → is.factor(VAR)

CONVERT_FACTOR → as.factor(VAR)

INDIVID_PER_LEVEL → summary(VAR)

LEVELS → levels(VAR)

SPEC_FACTOR_FUNC → tapply(VAR,VAR,STAT_FUNCTION)
| table(VAR)| table(VAR,VAR)

Data frames

CREATE_DATAFRAME → data.frame(COLS)

COLS → COL
| COL,COLS

COL → CHAINE=VECTOR
| CHAINE = VAR

CHECK_DATAFRAME → is.data.frame(VAR)

CONVERT_DATAFRAME → as.data.frame(VAR)

/* You can use t() as same as Matrix to transpose a data frame*/

SUBSET_DATAFRAME → VAR$CHAINE
|VAR[,D]
| VAR[,STRING]
| VAR[,VECTOR]
| VAR[,-D]
| VAR$CHAINE LOG_OP
BASIC_TYPE

| VAR[VAR$CHAINE LOG_OP BASIC_TYPE,]
| VAR[VAR$CHAINE LOG_OP BASIC_TYPE, VECTOR]
| VAR[VAR,VAR]
| subset(VAR, CHAINE LOG_OP BASIC_TYPE)
| attach(VAR),detach(VAR)

SPEC_DATAFRAME_FUNCTION (same as SPEC_MATRIX_FUNCTION)

Lists