Code_Aster

Titre : Opérateur REST_SPEC_TEMP
Responsable : DEVESA Georges

Version default

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Operator `REST_SPEC_TEMP`

1   Goal

Return of fields of results, in coordinates generalized or in the physical base, from frequential towards the temporal one and conversely by fast transform of Fourier (FFT).

This operator allows, starting from a transitory result of evolution on a frame of reference generalized or in the physical base, to get a result of frequential evolution on the same basis by direct transformation of Fourier of each transitory function of evolutions into each point and each component of the fields kinematics selected (displacements, speeds or accelerations). And reciprocally, starting from a result of frequential evolution on a frame of reference generalized or in the physical base, one gets a transitory result of evolution on the same basis by opposite transformation of Fourier of each harmonic function of evolutions into each point and each component of the fields kinematics selected.

For each transformed evolution, the operation is similar to that produced by the call to the operator `CALC_FONCTION` with the keyword `FFT`.

The produced concept is a concept of the type:

·   `dyna_trans` if the starting result transformed by FFT is of type `dyna_harmo`,

·   `dyna_harmo` if the starting result transformed by FFT is of type `dyna_trans`,

·   `tran_gene` if the starting result transformed by FFT is of type `harm_gene`,

·   `harm_gene` if the starting result transformed by FFT is of type `tran_gene`.

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2   Syntax

```
resphy = REST_SPEC_TEMP                                              [*]

              ( ♦ /  RESULT =   resu,              / [dyna_trans]
                                                   / [dyna_harmo]
                  /  RESU_GENE =  tg,              / [tran_gene]
                                                   / [harm_gene]
                ◊ /  TOUT_CHAM  =  'YES',
                ◊ /  NOM_CHAM   =  | 'DEPL',
                                   | 'QUICKLY',
                                   | 'ACCE',
                ◊    SYMMETRY =    / 'YES',         [DEFECT]
                                  / 'NOT',

                ◊    METHOD =     / 'PROL_ZERO',    [DEFECT]
                                  / 'TRUNCATION',
              )
```

If RESU_GENE of type tran_gene then [*] = harm_gene

If RESU_GENE of type harm_gene then [*] = tran_gene

If RESULT of type dyna_trans then [*] = dyna_harmo

If RESULT of type dyna_harmO then [*] = dyna_trans

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3   Operands

3.1   Operands RESU_GENE / RESULT

♦   /   RESU_GENE = tg

This keyword can be used if the concept to be transformed by direct or opposite FFT is an evolution result in generalized coordinates transitory of type tran_gene or frequential of type harm_gene.

/   RESULT = resu

This keyword can be used if the concept to be transformed by direct or opposite FFT is an evolution result on the basis of transitory physical type dyna_trans or frequential of type dyna_harmo.

3.2   Operands TOUT_CHAM/NOM_CHAM

◊   /   TOUT_CHAM = 'YES'

Allows to transform by direct or opposite FFT the fields of reference symbol DEPL, QUICKLY and ACCE contents in the generalized result (tran_gene, harm_gene) or on the physical basis (dyna_trans, dyna_harmo).

◊   /   NOM_CHAM = nomcha

List of the reference symbols of field which one wishes to transform by direct or opposite FFT: 'DEPL','QUICKLY','ACCE'.

3.3   Operand METHOD

◊   METHOD =

Algorithm FFT accepts as starter only one signal of which the number of samples is a power of 2.

Method 'PROL_ZERO' (by default) proposes to prolong the entry signal with zeros until having a full number of samples which is the first power of 2 whose value is higher than the initial number of samples.

Method 'TRUNCATION' will consider only the first samples of which the full number is more the great power of two whose value is lower than the initial number of samples.

For example, on a signal of 601 values, the method 'PROL_ZERO' will supplement the signal to have 1024 samples, whereas the method 'TRUNCATION' will consider only the first 512 moments.

If the entry signal with a number of samples which is a power of 2, the two methods are obviously equivalent: one takes into account the signal without modifying it.

3.4   Operand SYMMETRY

◊   SYMMETRY =

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Keyword which applies only for the opposite transform of Fourier. The spectrum (complex) provided as starter of the opposite FFT must comply with certain rules (to find a real temporal function in particular): compared to its point medium, its real part must be symmetrical and its leaves imaginary antisymmetric. In general, if this spectrum comes from a calculation of FFT, then these conditions of symmetry are observed (except voluntary truncation). On the other hand if one has only half of the spectrum, then it should be announced to the operator of calculation of FFT.

This information of symmetry of the spectrum is managed by the keyword SYMMETRY. If the spectrum is complete thus respecting symmetries, then the user must specify SYMMETRY = 'YES'. On the other hand, if the spectrum is truncated, then it is advisable to choose SYMMETRY = 'NOT'. The spectrum is then symmetrized: that involves a multiplication by 2 of its number of samples and thus of its maximum frequency.

Consequently, this operand applies only if the result to transform is a generalized frequential evolution (harm_gene) or on the physical basis (dyna_harmo).