pfpcoh (cohomology/homology groups for p F q) マ

Edition : auto generated by oxgentexi on 30 January 2008

OpenXM.org

1 pFq に関する (コ) ホモロジー

この節では超幾何関数 pFq ($_pF_q$) の (コ) ホモロジ群に関連した不変量を計算する関数を解説する.

OpenXM/Risa/Asir での利用にあたっては,

```
load("pfpcoh.rr")$ load("pfphom.rr")$
```

が始めに必要.

1.0.1 pfp_omega

`pfp_omega(P)`
: It returns the Gauss-Manin connection Omega for the generalized hypergeometric function P F P-1 (aa1,aa2, ...; cc1, cc2, ...;x) .

Description:

Define a vector valued function Y of which elements are generalized hypergeometric function f_1=F and f_2=xdf_1/dx, f3=xd f_2/dx, ... It satisfies dY/dx= Omega Y. Generalized hypergeometric function is defined by the series p F p-1(aa1,aa2, ...; cc1, cc2, ...;x) = sum(k=0,infty; (aa1)_k (aa2)_k .../((1)_k (cc1)_k (cc2)_k ...) x^k)

Example:

```
pfp_omega(3);
```

1.0.2 pfpcoh_intersection

`pfpcoh_intersection(P)`
: pfpcoh_intersection(P) returns an intersection matrix for cocycles associated to the generalized hypergeometric function p F_(p-1).

Description:

This program pfpcoh.rr computes an intersection matrix S of cocycles of p F p-1 and compares it with the matrix obtained by solving a differential equation for intersection matrix.

Algorithm:

Ohara, Sugiki, Takayama, Quadratic Relations for Generalized Hypergeometric Functions p F p-1

Example:

```
load("pfpcoh.rr")$
S=pfpcoh_intersection(3);
```

Author : K.Ohara

1.0.3 pfphom_intersection

pfphom_intersection(*P*)
: intersection matrix of homology cycles.

Description:

Computing intersection matrix of cycles associated to p F_(p-1). As to the meaning of parameters c1, c2, c3, ..., see the paper Ohara, Kyushu J. Math. Vol. 51 PP.123.

Algorithm:

Ohara, Sugiki, Takayama, Quadratic Relations for Generalized Hypergeometric Functions p F p-1

Example:

```
SS = pfphom_intersection(3)$
```

You get the intersection matrix of homologies for 3 F 2.

Author : K.Ohara

1.0.4 pfphom_monodromy_pair_kyushu

pfphom_monodromy_pair_kyushu(*P*)
:

Description:

It returns the pair of monodromy matrices.

Algorithm:

Ohara, Kyushu J. Math. Vol.51 PP.123 (1997)

Example:

```
MP = pfphom_monodromy_pair_kyushu(3)$
```

You get a pair of monodromy matricies for 3F2 standing for two paths encircling 0 and 1.

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