

ns_twistedlog.rr

ns_twistedlog.rr User's Manual
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by Keisuke Nishitani

1 ns_twistedlog.rr

1.1 ns_twistedlog.rr や

‘ns_twistedlog.rr’ twisted logarithmic cohomology 臂や 膊, 渦 冴ヤ, 紊縋 紘障 鴻
 認鞘脛 綏 合縋脛祉 膊, 育 違 縋 紘障 鴻 認鞘脛 縋 合縋脛祉 膊茵 宴若吾 .

1.2 Twisted logarithmic cohomology 臂や 膊

1.2.1 ns_twistedlog.twisted_log_cohomology

ns_twistedlog.twisted_log_cohomology(*FL*, *PL*, *VL*)
 :: Twisted logarithmic cohomology 臂や middle cohomology 臂や 阪菴.

FL 紊縋 鴻

PL <若帥 鴻

VL 紊違 鴻

- *PL* 紊違, 篆違 質違 箏紘 膊. 縋 *c*, 違 紘 generic *b*- 違 鴻 紊 質并鴻
 , 障違 阪 膊 , 違篆違 0 , <若帥紊違 翫 質違 翫
 阪脛違 翫.
- 3 紊違札箏 翫, twisted logarithmic cohomology 臂や *D*-臂や 翫. 翫 twisted
 logarithmic cohomology 臂や 膊 .

```
[1] ns_twistedlog.twisted_log_cohomology([x,y,1-x-y],[a,b,c],[x,y]);
-- nd_weyl_gr :0.003848sec(0.008291sec)
-- weyl_minipoly_by_elim :0.006988sec(0.007177sec)
-- generic_bfct_and_gr :0.01325sec(0.02175sec)
generic bfct : [[-1,1],[s,1],[s+a+b+c-1,1]]
S0 : 0
B_S0 length : 1
-- fctr(BF) + base :0.001454sec(0.005543sec)
dimension : 1
[1]
```

```
[2] ns_twistedlog.twisted_log_cohomology([x,y,1-x-y],[-1,-2,-3],[x,y]);
-- nd_weyl_gr :0.001845sec(0.001838sec)
-- weyl_minipoly_by_elim :0.003972sec(0.003971sec)
-- generic_bfct_and_gr :0.007363sec(0.007584sec)
generic bfct : [[-1,1],[s,1],[s-7,1]]
S0 : 7
B_S0 length : 36
-- fctr(BF) + base :0.02438sec(0.03323sec)
dimension : 3
[y^2*x^5,y^7,1]
```

```
[3] ns_twistedlog.twisted_log_cohomology([x*z+y,x^4+y^5+x*y^4],[0,0],[x,y,z]);
-- nd_weyl_gr :0.004sec(0.0028sec)
```

```

weyl_minipoly_by_elim : b-function does not exist
stopped in weyl_minipoly_by_elim2 at line 378 in file "/usr/local/ox/OpenXM/src/
asir-contrib/packages/src/nk_restriction.rr"
378          error("weyl_minipoly_by_elim : b-function does not exist");
(debug)

```

```
ns_twistedlog.twisted_log_cohomology(option)
```

1.2.2 ns_twistedlog.twisted_log_cohomology(option)

```
ns_twistedlog.twisted_log_cohomology(...| exp = f, check = n, s0 = m, excp
= v)
```

```
:: ns_twistedlog.twisted_log_cohomology 激 漏
```

f 素数

n 0 障 1

m 價

v 0 障 1

- \exp 紘, 素数 twisted 育 $\exp(f)$ 障 漏 twisted logarithmic cohomology 臂や 膊菌.
- $n = 0$, twisted logarithmic cohomology 臂や D -臂や 膊菌.
- $s0$ 紘, $s-m$ generic b - 違 膊菌. ヤ generic b - 違 膊 .
- $v = 0$, 膊 膊菌. <若帥 障素違 價違 皿紘 , 宴 阪 . excp 紘 違 阪 荐膊 Buchberger 眼 牙 障丞 , 荐膊 惹 .

```

[4] ns_twistedlog.twisted_log_cohomology([x,y,1-x-y],[a,b,c],[x,y]|exp = x+y);
-- nd_weyl_gr :0.004sec + gc : 0.004sec(0.006156sec)
-- weyl_minipoly_by_elim :0sec(0.001558sec)
-- generic_bfct_and_gr :0.004sec + gc : 0.004sec(0.008213sec)
generic bfct : [[1,1],[s,1],[s-1,1],[s+a+b-1,1]]
S0 : 1
B_S0 length : 3
-- fctr(BF) + base :0sec(0.000469sec)
dimension : 2
[y,1]

```

```

[5] ns_twistedlog.twisted_log_cohomology([x*z+y,x^4+y^5+x*y^4],[0,0],[x,y,z]|ch
eck = 1);
Hilbert polynomial : 1/24*x^4+65/12*x^3-529/24*x^2+727/12*x-51
holonomic : No
-- nd_weyl_gr :0.004001sec(0.002876sec)
weyl_minipoly_by_elim : b-function does not exist
stopped in weyl_minipoly_by_elim2 at line 378 in file "/usr/local/ox/OpenXM/src/
asir-contrib/packages/src/nk_restriction.rr"
378          error("weyl_minipoly_by_elim : b-function does not exist");
(debug)

```

```

[6] ns_twistedlog.twisted_log_cohomology([x*z+y,x^4+y^5+x*y^4],[0,0],[x,y,z]|s0 = 1
);
dimension : 3
[y,z,1]

[7] ns_twistedlog.twisted_log_cohomology([x,y,1-x-y],[a,b,c],[x,y]|excp = 1);
generic bfct : [[-1,1],[s,1],[s+a+b+c-1,1]]
S0 : 0
B_S0 length : 1
dimension : 1
[[1],[a+b+c-1,a,b]]

```

1.2.3 ns_twistedlog.difference_equation

```

ns_twistedlog.difference_equation(FL,PL,VL)
:: 素縷 紘障筋認鞘 違 綬 合縷膾祉菴.

```

FL 素縷 鴻

PL 素縷 鴻 (<若帥 綽)

VL 腥茵素違 鴻

- Twisted logarithmic cohomology 臂や 阪 , 素縷 紘障筋認鞘腥 菴 黠合縷膾祉荐膊.
- 綬 合縷荐膊 , <若帥素縷 帥 翫 . <若帥 障素違 膾違 箏紘 宴. , 素縷 就 札箏箏 .
- 1. 素縷 違 , 障 <若帥茵 1 紘+違 就 .
- 2. <若帥 障素違 悟違 .
- 3. <若帥 障素違 違 1 .

皿紘羣 ュ 阪縊 .

- 3 素違札箏 翫 , twisted logarithmic cohomology 臂やD-臂や , 荐膊 翫.

箏ヤ, $p(a,b,c) = \int_C x^{a-1}y^{b-1}(1-x-y)^{c-1} dx dy$ 綬 合縷膾祉荐膊箏 .

```

[8] ns_twistedlog.difference_equation([x,y,1-x-y],[a,b,c],[x,y]);
-- nd_weyl_gr :0sec(0.000421sec)
-- weyl_minipoly_by_elim :0sec(0.001051sec)
Order : 1
[(-ea+1)*a-ea*b-ea*c,eb*a+(eb-1)*b+eb*c,ec*a+ec*b+(ec-1)*c]

```

箏ヤ ュ .

```

[9] ns_twistedlog.difference_equation([x,y,1-x-y],[a,b,a-b],[x,y]);
-- nd_weyl_gr :0sec(0.0003741sec)
-- weyl_minipoly_by_elim :0.004sec + gc : 0.004sec(0.006554sec)
Order : 1
[-ea,eb,1]

```

```

[10] ns_twistedlog.difference_equation([x,y,1-x-y],[-a,-b,2*c],[x,y]);
-- nd_weyl_gr :0sec(0.0003951sec)
-- weyl_minipoly_by_elim :0sec(0.001059sec)

```

```

Order : 1
[(ea-1)*a+ea*b-2*ea*c,-eb*a+(-eb+1)*b+2*eb*c,ec*a+ec*b+(-2*ec+2)*c]
ns_twistedlog.difference_equation(option)

```

1.2.4 ns_twistedlog.difference_equation(option)

```

ns_twistedlog.difference_equation(... | exp = f, check = n, inhom = h,
shift = p,
order = m, excp = v)
:: ns_twistedlog.difference_equation 激 渦 .

```

f 素綫

n 0 障 1

h 0 障 1

p < 若

m 膺

v 0 障 1

- \exp 紘, 茵 違 育 $\exp(f)$ 翫 黠合縹膺祉荐膺.
- $n = 0$, twisted logarithmic cohomology 臂や D -臂や ㇿ茵.
- $h = 0$, 黠 膺茵.
- shift 紘, 紘 < 若帥 綫 合縹 帥荐膺. 黠合縹膺祉羔紙茵, 合 荐膺 .
- $s = 0$ 紘, $s = m$ generic b - 違 膺茵. や generic b - 違 膺 .
- $v = 0$, ㇿ 膺茵. < 若帥 障素違 膺違 皿紘 , 宴 阪 . excp 紘 違 阪荐膺 Buchberger 眼 冴 障丞 , 荐膺 惹 . excp inhom, shift, order 週 .

```

[11] ns_twistedlog.difference_equation([x,y,1-x-y],[a,b,c],[x,y]|inhomo = 1);
-- nd_weyl_gr :0sec(0.0003991sec)
-- weyl_minipoly_by_elim :0sec(0.001058sec)
Order : 1
[[(-ea+1)*b*a-ea*b^2-ea*c*b,[(y^2-y)*dy+b*x+(b+c)*y-b)*dx+(-y^2+y)*dy^2+((-a-b-c)*y+b)*dy,(-a-b-c)*x+(-b-c)*y]], [eb*a+(eb-1)*b+eb*c,[(y^2-y)*dy+b*x+(b+c)*y-b)*dx+(-y^2+y)*dy^2+((-a-b-c)*y+b)*dy,-y]], [ec*b*a+ec*b^2+(ec-1)*c*b,[(y^2-y)*dy+b*x+(b+c)*y-b)*dx+(-y^2+y)*dy^2+((-a-b-c)*y+b)*dy,(-a-b-c)*x-c*y]]

[12] ns_twistedlog.difference_equation([x,y,1-x-y],[a,b,c],[x,y]|shift = a);
-- nd_weyl_gr :0.004sec(0.0004289sec)
-- weyl_minipoly_by_elim :0sec(0.001042sec)
Order : 1
[(ea-1)*a+ea*b+ea*c]

```

1.2.5 ns_twistedlog.differential_equation

```

ns_twistedlog.differential_equation(EXP,FL,PL,TVL,XVL)
:: 育 違 縹 紘障苜認鞘 違 縹 合縹膺祉菴.

```

EXP 素縷

FL 素縷 鴻

PL 素縷 鴻

TVL 脛茵素違 鴻

XVL <若帥 違 鴻

- Twisted logarithmic cohomology 臂や 阪 , 育 違 縷 紘障筋認鞘 違 電 小合縷膾 祉荐膊.
- 縷 合縷荐膊 , <若帥育 違 翫 . 素縷 違紘 罕 , 違 阪 . <若 帥 障素違喝縷 障素違, 膺違 箏紘 宴.
- 3素遺札箏 翫 , twisted logarithmic cohomology 臂やD-臂や , 荐膊 翫.

篁や $f(x_1, x_2) = \int_C \exp(x_1 t_1 + x_2 t_2) t_1^{a-1} t_2^{b-1} dt_1 dt_2$ 縷 合縷膾 祉荐膊箏 .

```
[13] ns_twistedlog.differential_equation(x1*t1+x2*t2,[t1,t2],[a,b],[t1,t2],[x1,x2])
;
-- nd_weyl_gr :0sec(0.0004089sec)
-- weyl_minipoly_by_elim :0sec(0.000495sec)
Order : 1
[x1*dx1+a,-x2*dx2-b]

ns_twistedlog.differential_equation(option)
```

1.2.6 ns_twistedlog.differential_equation(option)

ns_twistedlog.differential_equation(... | check = n, inhom = h, diff = p, order = m, excp = v)

:: ns_twistedlog.differential_equation 激 漏

n 0 障 1

h 0 障 1

p <若

m 膺

v 0 障 1

- n 0 , twisted logarithmic cohomology 臂やD-臂や ㇿ茵.
- h 0 , 電 膊茵.
- diff 紘, 紘 <若帥 縷 合縷 帥荐膊. 小合縷膾祉羔紙茵, 合 荐膊 .
- s0 紘, s-m generic b- 違 膊茵. や generic b- 違 膊 .
- v 0 , ㇿ 膊茵. <若帥 障素違 膺違 皿紘 , 宴 阪 . excp 紘 違 阪 荐膊 Buchberger 眼 冴 障丞 , 荐膊 惹 . excp inhom, diff, order 週 .

```
[14] ns_twistedlog.differential_equation(x1*t1+x2*t2,[t1,t2],[a,b],[t1,t2],[x1,x2]|
diff = x1);
-- nd_weyl_gr :0sec(0.0007901sec)
```

```
-- weyl_minipoly_by_elim :0sec + gc : 0.008sec(0.006175sec)
Order : 1
[x1*dx1+a]
```

1.3

1.3.1 ns_twistedlog.twisted_deRham

```
ns_twistedlog.twisted_deRham(F,P,VL)
:: Twisted de Rham cohomology 臂や middle cohomology 臂や 阪菴.

F      素縷
P      <若
VL      素違 鴻
• P 素違 翫, 篆違 贗違 箏紘 膊. 緇c, 違 統 generic b- 違 鴻 素 贗井鴻
, 障違 阪 膊 , 違篆違 0 , <若帥素違 翫 贗違 翫
阪脰違 翫.

[15] ns_twistedlog.twisted_deRham(x*y*(1-x-y),a,[x,y]);
-- nd_weyl_gr :0sec(9.489e-05sec)
-- weyl_minipoly :0sec(0.0002191sec)
-- generic_bfct_and_gr :0sec(0.000423sec)
generic bfct : [[1,1],[s,1]]
S0 : 0
B_S0 length : 1
-- fctr(BF) + base :0sec(6.008e-05sec)
dimension : 0
[]

[16] ns_twistedlog.twisted_deRham(x*y*(1-x-y),-1,[x,y]);
-- nd_weyl_gr :0sec(0.0001891sec)
-- weyl_minipoly :0sec(0.000247sec)
-- generic_bfct_and_gr :0sec(0.0006139sec)
generic bfct : [[1,1],[s,1],[s-1,1]]
S0 : 1
B_S0 length : 3
-- fctr(BF) + base :0.004sec(0.0002241sec)
dimension : 3
[x,y,1]
```

1.3.2 ns_twistedlog.holonomic

```
ns_twistedlog.holonomic(Id, VL, DVL)
:: D 窪や Id 井羣縷 鴻菴. -1 菴.

Id      や 鴻
VL      素違 鴻
DVL      素違 鴻 (VL 綽緇 箵 鴻 )
```



```
[17] ns_twistedlog.holonomic([x*dy,y*dx],[x,y],[dx,dy]);  
Hilbert polynomial : x^2+1  
holonomic : Yes  
holonomic rank : 1  
[1]
```

```
[18] ns_twistedlog.holonomic([(x^3-y^2)*dx+3*x^2,(x^3-y^2)*dy-2*y],[x,y],[dx,  
dy]);  
Hilbert polynomial : 1/2*x^3+2*x^2+1/2*x+2  
holonomic : No  
-1
```

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(Index is nonexistent)

(Index is nonexistent)

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