nn_ndbf

nn_ndbf User's Manual
Edition 1.0
Nov 2009

by Masayuki Noro and Kenta Nishiyama

1 New b-function package nn_ndbf.rr

奢 , asir-contrib , ·b ‘nn_ndbf.rr’ . , ‘nn_ndbf.rr’ .

```
[...] load("nn_ndbf.rr");
```

, t ndbf. . 奢 , .

1.1 b

1.1.1 ndbf.bfunction

ndbf.bfunction(*f*[|weight=*w*,heruristic=*yesno*,vord=*v*,op=*yesno*]) :: *f* b .

return

f

w [*v1,w1,...,vn,wn*]

yesno 0 1

v

- asir-contrib ‘nn_ndbf.rr’ d.
- *f* b (global b-function) . b , · op=1 , b *b*, *P* *[b,P]* . *Pf^(s+1)=b(s)f^s* . *v1,...,vn,dv1,...,dvn* · . , d ··, ·p , ·5·.
- · weight=[*v1,w1,...,vn,wn*] , *(v1,...,vn)* · weight *(w1,...,wn)* . ·, *f* *(w1,...,wn)* · weighted homogeneous .
- · heuristic=1 , ·. t 礬 .
- , , · vord=v ☒ .

```
[...] load("nn_ndbf.rr");
[...] ndbf.bfunction(x^3-y^2*z^2);
-11664*s^7-93312*s^6-316872*s^5-592272*s^4-658233*s^3-435060*s^2
-158375*s-24500
[...] ndbf.bfunction(x^3-y^2*z^2|op=1);
[-11664*s^7-93312*s^6-316872*s^5-592272*s^4-658233*s^3-435060*s^2
-158375*s-24500,(108*z^3*x*dz^3+756*z^2*x*dz^2+1080*z*x*dz+216*x)*dx^4
...
+(729/8*z^3*dz^5+9477/8*z^2*dz^4+5103/2*z*dz^3+2025/2*dz^2)*dy^2]
[...] F=256*u1^3-128*u3^2*u1^2+(144*u3*u2^2+16*u3^4)*u1-27*u2^4
-4*u3^3*u2^2$
[...] ndbf.bfunction(F|weight=[u3,2,u2,3,u1,4]);
576*s^6+3456*s^5+8588*s^4+11312*s^3+8329*s^2+3250*s+525
```

1.1.2 ndbf.bf_local

ndbf.bf_local(*f*,*p*[|weight=*w*,heruristic=*yesno*,vord=*v*,op=*yesno*]) :: *f* *p* b .

return

f

p [*v1,a1,...,vn,an*]

w [*v1,w1,...,vn,wn*]

yesno 0 1

v

- asir-contrib 'nn_ndbf.rr' d.
- *f* *(v1,...,vn)=(a1,...,an)* b (local b-function) . b , .
- b , · op=1 , b *b*, $a(x)$ *P* *[b,a(x),P]* . *a(x)Pf^(s+1)=b(s)f^s* . *v1,...,vn,dv1,...,dvn* · . , d ··, ·p , ·5·.
- · weight=[*v1,w1,...,vn,wn*] , *(v1,...,vn)* · weight *(w1,...,wn)* . ·, *f* *(w1,...,wn)* · weighted homogeneous .
- · heuristic=1 , ·. t 礬 .
- , , · vord=*v* ☒ .

```
[...] load("nn_ndbf.rr");
[...] ndbf.bf_local(y*((x+1)*x^3-y^2),[x,-1,y,0]);
[[-s-1,2]]
[...] ndbf.bf_local(y*((x+1)*x^3-y^2),[x,-1,y,0]|op=1);
[[[-s-1,2]],12*x^3+36*y^2*x-36*y^2,(32*y*x^2+56*y*x)*dx^2
+((-8*x^3-2*x^2+(128*y^2-6)*x+112*y^2)*dy+288*y*x+(-240*s-128)*y)*dx
+(32*y*x^2-6*y*x+128*y^3-9*y)*dy^2+(32*x^2+6*s*x+640*y^2+39*s+30)*dy
+(-1152*s^2-3840*s-2688)*y]
```

1.1.3 ndbf.bf_strat

ndbf.bf_strat(*f*[|weight=*w*,heruristic=*h*,vord=*v*])
:: *f* , b 魯 (stratification) .

return

f

w [*v1,w1,...,vn,wn*]

h 0 1

v

- asir-contrib 'nn_ndbf.rr' d.
- *f* b (global b-function) . *s* .
- · weight=[*v1,w1,...,vn,wn*] , *(v1,...,vn)* · weight *(w1,...,wn)* . ·, *f* *(w1,...,wn)* · weighted homogeneous .
- · heuristic=1 , ·. t 礬 .
- , , · vord=*v* ☒ .

```
[...] load("nn_ndbf.rr");
[...] F=256*u1^3-128*u3^2*u1^2+(144*u3*u2^2+16*u3^4)*u1-27*u2^4
-4*u3^3*u2^2$
[...] ndbf.bf_strat(F);
[[[u3^2,-u1,-u2],[-1],[[-s-1,2],[16*s^2+32*s+15,1],[36*s^2+72*s+35,1]]],
```

```
[[-4*u1+u3^2,-u2],[96*u1^2+40*u3^2*u1-9*u3*u2^2,...],[[-s-1,2]]],
[[-2048*u1^3-...],[-u3*u2,u2*u1,...],[[-s-1,1],...]]],
[[-256*u1^3+128*u3^2*u1^2+...],[...],[[-s-1,1]]],
[[],[-256*u1^3+128*u3^2*u1^2+...],[]]]
```

1.1.4 ndbf.action_on_gfs

`ndbf.action_on_gfs(`*op*`,`*v*`,`*gfs*`)`
:: *op* *gf^(s+a)* .

return

op

gfs *[g,f,s+a]*

v *f* (*v=[v1,...,vn]*)

- *op* *gf^(s+a)* ·.
- *g* *v1,...,vn* .
- *op* *[v1,...,vn,dv1,...,dvn]* .
- *[g,f,s+a]* *gf^(s+a)* .
- · *[h,f,s+c]* , *hf^(s+b)* . *c* 0. *op* b- *b(s)* , *a=1* ·*c=0* , *h=b(s)* (global case) *h=d(v)b(s)* (local case) .

```
[...] load("nn_ndbf.rr");
[...] F=x^5-y^2*z^2$
[...] B=ndbf.bfunction(F|op=1)$
[...] ndbf.action_on_gfs(B[1],[x,y,z],[1,F,s+1]);
[-62500000000*s^13-...-2985505717194*s-245434132944,x^5-z^2*y^2,s]
[...] L=ndbf.bf_local(F,[x,0,y,0,z,1]|op=1)$
[...] ndbf.action_on_gfs(L[2],[x,y,z],[1,F,s+1]);
[(-100000*s^5-500000*s^4-990000*s^3-970000*s^2-470090*s-90090)*z^2,
 x^5-z^2*y^2,s]
```

1.2 Annihilator

1.2.1 ndbf.ann

`ndbf.ann(`*f*`[|weight=`*w*`]) :: f ·f^s annihilator ideal .`

return

f

w `[`*v1*`,`*w1*`,...,`*vn*`,`*wn*`]`

- asir-contrib 'nn_ndbf.rr' d.
- *f* ·, *f^s* annihilator ideal . , *s* . , `ndbf.bf_local` .
- · `weight=[`*v1*`,`*w1*`,...,`*vn*`,`*wn*`]` , *(v1,...,vn)* · weight *(w1,...,wn)* . ·, *f* *(w1,...,wn)* · weighted homogeneous .

```
[...] load("nn_ndbf.rr");
[...] ndbf.ann(x*y*z*(x^3-y^2*z^2));
```

```
[(-x^4*dy^2+3*z^4*x*dz^2+12*z^3*x*dz+6*z^2*x)*dx+4*z*x^3*dz*dy^2
-z^5*dz^3-6*z^4*dz^2-6*z^3*dz,
(x^4*dy-3*z^3*y*x*dz-6*z^2*y*x)*dx-4*z*x^3*dz*dy+z^4*y*dz^2+3*z^3*y*dz,
(-x^4+3*z^2*y^2*x)*dx+(4*z*x^3-z^3*y^2)*dz,2*x*dx+3*z*dz-11*s,
-y*dy+z*dz]
```

Index

（インデックスがありません）

（インデックスがありません）

簡単な目次

目次