

```

> restart: unprotect('D'):

m := 7;

twist := - 7;

d := 16;          degree := d + 1:

##

TT := x^(d+1) + 1^(d+1) + 1*x^floor(d/2);

##

Jetyx := expand(
+ (1/Rz^(m-0*2)) * add(AA||j * x1^(m-0*3-j) * (y1)^j *
Delta_yx^0, j=0..m-0*3)
+ (1/Rz^(m-1*2)) * add(BB||j * x1^(m-1*3-j) * (y1)^j *
Delta_yx^1, j=0..m-1*3)
+ (1/Rz^(m-2*2)) * add(CC||j * x1^(m-2*3-j) * (y1)^j *
Delta_yx^2, j=0..m-2*3)
+ (1/Rz^(m-3*2)) * add(DD||j * x1^(m-3*3-j) * (y1)^j *
Delta_yx^3, j=0..m-3*3)
) ;

##

dA := (m-0*2)*d - (m-0*3)*2 - 0*3 + twist:
dB := (m-1*2)*d - (m-1*3)*2 - 1*3 + twist:
dC := (m-2*2)*d - (m-2*3)*2 - 2*3 + twist:
dD := (m-3*2)*d - (m-3*3)*2 - 3*3 + twist:

##

Delta_yx := y1*x2 - y2*x1:

Soly1 := - x1*Rx/Ry - z1*Rz/Ry:

```

```
Soly2 := -x1^2*Rxx/Ry+2*x1^2*Rxy*Rx/Ry^2+2*x1*Rxy*z1*Rz/Ry^2-2*
x1*z1*Rxz/Ry-Ryy*x1^2*Rx^2/Ry^3-2*Ryy*x1*Rx*z1*Rz/Ry^3-Ryy*z1^2*
Rz^2/Ry^3+2*z1*Ryz*x1*Rx/Ry^2+2*z1^2*Ryz*Rz/Ry^2-z1^2*Rzz/Ry-x2*
Rx/Ry-z2*Rz/Ry:
```

```
##
```

```
Jetzx := sort(mtaylor(
                                expand(subs(x2=(Deltazx+x1*z2)/z1,
                                expand(  subs({y1=Soly1,y2=Soly2},
Jetyx)))),
                                [x1,z1,Deltazx], 100), [x1,z1,Deltazx]):
```

```
##
```

```
printlevel := 2:
for k from 0 to m/3 do
for j from 0 to m-3*k do
```

```
EEEq[m-j-3*k,j,k] := factor(
    Rz^(m-j-3*k)
*
    Ry^(m-2*k)
*
    coeftayl(Jetzx, [x1,z1,Deltazx]=[0,0,0], [m-j-3*k,j,k])):
```

```
od: od:
```

```
## EQUATION RR EXPLICITE
```

```
RR := z^(d+1) + y^(d+1) + TT;
```

```
Rx := diff(RR,x):
Ry := diff(RR,y):
Rz := diff(RR,z):
```

```
Rxx := diff(RR,x,x):
Rxy := diff(RR,x,y):
Rxz := diff(RR,x,z):
Ryy := diff(RR,y,y):
Ryz := diff(RR,y,z):
Rzz := diff(RR,z,z):
```

```
##
```

```

printlevel := 2:
for k from 0 to m/3 do
for j from 0 to m-3*k do

```

```

EEEq[m-j-3*k,j,k] := mtaylor(EEEq[m-j-3*k,j,k], z, (m-j-3*k)*d):

```

```

od: od:

```

```

##

```

```

for j1 from 0 to 1+m*d+d do

```

```

ny[j1] := (-z^(d+1)-TT)^(floor(j1/(d+1))) * y^(j1-(d+1)*floor(j1/
(d+1))):

```

```

od:

```

$m := 7$

$twist := -7$

$d := 16$

$TT := x^{17} + x^8 + 1$

$$\begin{aligned}
Jetyx := & \frac{AA0 x^{17}}{Rz^7} + \frac{AA1 x^{16} y^1}{Rz^7} + \frac{AA2 x^{15} y^2}{Rz^7} + \frac{AA3 x^{14} y^3}{Rz^7} + \frac{AA4 x^{13} y^4}{Rz^7} \\
& + \frac{AA5 x^{12} y^5}{Rz^7} + \frac{AA6 x^{11} y^6}{Rz^7} + \frac{AA7 y^{17}}{Rz^7} + \frac{BB0 x^{14} Delta_{yx}}{Rz^5} \\
& + \frac{BB1 x^{13} y^1 Delta_{yx}}{Rz^5} + \frac{BB2 x^{12} y^2 Delta_{yx}}{Rz^5} + \frac{BB3 x^{11} y^3 Delta_{yx}}{Rz^5} \\
& + \frac{BB4 y^{14} Delta_{yx}}{Rz^5} + \frac{CC0 x^{17} Delta_{yx}^2}{Rz^3} + \frac{CC1 y^{17} Delta_{yx}^2}{Rz^3}
\end{aligned}$$

$RR := x^{17} + y^{17} + z^{17} + x^8 + 1$

(1)

```

> ##

```

```

for l from 0 to m-0*3 do AA||l := add(A||l[j]*y^j, j=0..min(d,
dA)): od:

```

```

for l from 0 to m-1*3 do BB||l := add(B||l[j]*y^j, j=0..min(d,
dB)): od:

```

```

for l from 0 to m-2*3 do CC[l] := add(C[l][j]*y^j, j=0..min(d,
dC)): od:

```

```

for l from 0 to m-3*3 do DD[l] := add(D[l][j]*y^j, j=0..min(d,
dD)): od:

```

```

> ##

```

```

1 + m*d + d:

```

```

printlevel := 2:

```

```

for k from 0 to m/3 do

```

```

for j from 0 to m-3*k do

```

```

degree(EEEq[m-j-3*k,j,k], y):

```

```

EEEq[m-j-3*k,j,k] := mtaylor(EEEq[m-j-3*k,j,k], y, 1+m*d+d):

```

```

dy[m-j-3*k,j,k] := degree(EEEq[m-j-3*k,j,k], y):

```

```

od: od:

```

```

> ##

```

```

printlevel := 3:

```

```

for k from 0 to m/3 do

```

```

for j from 0 to m-3*k do

```

```

for j1 from 0 to dy[m-j-3*k,j,k] do

```

```

Cy[m-j-3*k,j,k,j1] := coeff(EEEq[m-j-3*k,j,k], y, j1):

```

```

od:

```

```

od: od:

```

```

> ##

printlevel := 2:
for k from 0 to m/3 do
for j from 0 to m-3*k do

EEq[m-j-3*k,j,k] := add(Cy[m-j-3*k,j,k,j1]*ny[j1], j1=0..dy[m-
j-3*k,j,k]):

degree(EEq[m-j-3*k,j,k], y):

od: od:

```

```

> ##

printlevel := 2:
for l from 0 to m-0*3 do
for j from 0 to min(d,dA) do

A||l[j] := add(A||l[j,k]*z^k, k=0..dA-j):

od: od:

printlevel := 2:
for l from 0 to m-1*3 do
for j from 0 to min(d,dB) do

B||l[j] := add(B||l[j,k]*z^k, k=0..dB-j):

od: od:

printlevel := 2:
for l from 0 to m-2*3 do
for j from 0 to min(d,dC) do

C||l[j] := add(C||l[j,k]*z^k, k=0..dC-j):

od: od:

```

```

printlevel := 2:
for l from 0 to m-3*3 do
for j from 0 to min(d,dD) do

D||l[j] := add(D||l[j,k]*z^k, k=0..dD-j):

od: od:

```

```

> ##

printlevel := 2:
for k from 0 to m/3 do
for j from 0 to m-3*k do

EEq[m-j-3*k,j,k] := mtaylor(EEq[m-j-3*k,j,k], z, (m-j-3*k)*d):

degree(EEq[m-j-3*k,j,k], z):

od: od:

```

```

> ##

printlevel := 3:
for l from 0 to m-0*3 do
for j from 0 to min(d,dA) do
for k from 0 to dA-j do

A||l[j,k] := add(A||l[i,j,k]*x^i, i=0..dA-j-k):

od: od: od:

printlevel := 3:
for l from 0 to m-1*3 do
for j from 0 to min(d,dB) do
for k from 0 to dB-j do

B||l[j,k] := add(B||l[i,j,k]*x^i, i=0..dB-j-k):

od: od: od:

```

```

printlevel := 3:
for l from 0 to m-2*3 do
for j from 0 to min(d,dC) do
for k from 0 to dC-j do

C||l[j,k] := add(C||l[i,j,k]*x^i, i=0..dC-j-k):

od: od: od:

```

```

printlevel := 3:
for l from 0 to m-3*3 do
for j from 0 to min(d,dD) do
for k from 0 to dD-j do

D||l[j,k] := add(D||l[i,j,k]*x^i, i=0..dD-j-k):

od: od: od:

```

```

##

```

```

for l from 0 to m - 0*3 do nops(expand(AA||l)) od;
for l from 0 to m - 1*3 do nops(expand(BB||l)) od;
for l from 0 to m - 2*3 do nops(expand(CC||l)) od;
for l from 0 to m - 3*3 do nops(expand(DD||l)) od;

```

60894

60894

60894

60894

60894

60894

60894

60894

26384

26384

26384

26384

26384

6171

6171

```

> ##

printlevel := 2:
for k from 0 to m/3 do
for j from 0 to m-3*k do

Eq[m-j-3*k,j,k] := mtaylor(EEq[m-j-3*k,j,k], z, (m-j-3*k)*d):

degree(Eq[m-j-3*k,j,k], z):

od: od:

```

```

> ##

printlevel := 2:
for k from 0 to m/3 do
for j from 0 to m-3*k do

degree(Eq[m-j-3*k,j,k], y):

od: od;

16
16
16
16
16
16
16
- ∞
16
16
16
16
- ∞
16
- ∞

```

```

> ## SYSTEM FOR DIVISIBILITY BY  $z^{(1*d)}$ 

Systemez1d := {}:

for k from 0 to (m-1)/3 do

Coeffs_z1d[1,m-1-3*k,k] := {coeffs(expand(mtaylor(Eq[1,m-1-3*k,
k], z, 1*d)), [x,y,z])}:

Systemez1d := Systemez1d union Coeffs_z1d[1,m-1-3*k,k]:

od:

Systeme_z1d := Systemez1d:

## VARIABLES FOR DIVISIBILITY BY  $z^{(1*d)}$ 

Variables_z1d := indets(Systeme_z1d):

## RESOLUTION  $z^{(1*d)}$ 

Solutions_z1d := solve(Systeme_z1d, Variables_z1d):

assign(Solutions_z1d):

##

for l from 0 to m - 0*3 do nops(expand(AA||l)) od;
for l from 0 to m - 1*3 do nops(expand(BB||l)) od;
for l from 0 to m - 2*3 do nops(expand(CC||l)) od;
for l from 0 to m - 3*3 do nops(expand(DD||l)) od;

```

60894

60894

60894

60894

60894

60894
 198105
 364623
 26384
 26384
 26384
 122545
 204292
 4115
 4997

(4)

```
> ## SYSTEM FOR DIVISIBILITY BY  $z^{(2*d)}$ 

Systemez2d := {}:

for k from 0 to (m-2)/3 do

  Coeffs_z2d[2,m-2-3*k,k] := {coeffs(expand(mtaylor(Eq[2,m-2-3*k,
  k], z, 2*d)), [x,y,z])}:

  Systemez2d := Systemez2d union Coeffs_z2d[2,m-2-3*k,k]:

od:

Systeme_z2d := Systemez2d:

## VARIABLES FOR DIVISIBILITY BY  $z^{(2*d)}$ 

Variables_z2d := indets(Systeme_z2d):

## RESOLUTION  $z^{(2*d)}$ 

Solutions_z2d := solve(Systeme_z2d, Variables_z2d):

assign(Solutions_z2d):

##

for l from 0 to m - 0*3 do nops(expand(AA||l)) od;
for l from 0 to m - 1*3 do nops(expand(BB||l)) od;
for l from 0 to m - 2*3 do nops(expand(CC||l)) od;
for l from 0 to m - 3*3 do nops(expand(DD||l)) od;
```

60894
 60894
 60894
 60894
 60894
 763414
 540900
 886555
 26384
 26384
 93771
 102090
 120650
 3656
 4527

(5)

```

> ## SYSTEM FOR DIVISIBILITY BY  $z^{(3*d)}$ 

Systemez3d := {}:

for k from 0 to (m-3)/3 do

  Coeffs_z3d[3,m-3-3*k,k] := {coeffs(expand(mtaylor(Eq[3,m-3-3*k,
k], z, 3*d)), [x,y,z])}:

  Systemez3d := Systemez3d union Coeffs_z3d[3,m-3-3*k,k]:

od:

Systeme_z3d := Systemez3d:

## VARIABLES FOR DIVISIBILITY BY  $z^{(3*d)}$ 

Variables_z3d := indets(Systeme_z3d):

## RESOLUTION  $z^{(3*d)}$ 

Solutions_z3d := solve(Systeme_z3d, Variables_z3d):

assign(Solutions_z3d):

##
  
```

```

for l from 0 to m - 0*3 do nops(expand(AA||l)) od;
for l from 0 to m - 1*3 do nops(expand(BB||l)) od;
for l from 0 to m - 2*3 do nops(expand(CC||l)) od;
for l from 0 to m - 3*3 do nops(expand(DD||l)) od;

```

```

60894
60894
60894
60894
940943
905235
881972
1037565
26384
33948
43667
49311
36201
14301
16560

```

(6)

```

> ## SYSTEM FOR DIVISIBILITY BY  $z^{(4*d)}$ 

Systemez4d := {}:

for k from 0 to (m-4)/3 do

  Coeffs_z4d[4,m-4-3*k,k] := {coeffs(expand(mtaylor(Eq[4,m-4-3*k,
k], z, 4*d)), [x,y,z])}:

  Systemez4d := Systemez4d union Coeffs_z4d[4,m-4-3*k,k]:

od:

Systeme_z4d := Systemez4d:

## VARIABLES FOR DIVISIBILITY BY  $z^{(4*d)}$ 

Variables_z4d := indets(Systeme_z4d):

## RESOLUTION  $z^{(4*d)}$ 

```

```
Solutions_z4d := solve(Systeme_z4d, Variables_z4d):
```

```
assign(Solutions_z4d):
```

```
##
```

```
for l from 0 to m - 0*3 do nops(expand(AA||l)) od;  
for l from 0 to m - 1*3 do nops(expand(BB||l)) od;  
for l from 0 to m - 2*3 do nops(expand(CC||l)) od;  
for l from 0 to m - 3*3 do nops(expand(DD||l)) od;
```

60894

60894

60894

520090

619134

658533

698522

720286

674

1404

1718

950

1

1208

1475

(7)

```
> ## SYSTEM FOR DIVISIBILITY BY  $z^{(5*d)}$ 
```

```
Systemez5d := {}:
```

```
for k from 0 to (m-5)/3 do
```

```
  Coeffs_z5d[5,m-5-3*k,k] := {coeffs(expand(mtaylor(Eq[5,m-5-3*k,  
  k], z, 5*d)), [x,y,z])}:  
  Systemez5d := Systemez5d union Coeffs_z5d[5,m-5-3*k,k]:  
od:
```

```
Systeme_z5d := Systemez5d:
```

```

## VARIABLES FOR DIVISIBILITY BY  $z^{(5*d)}$ 

Variables_z5d := indets(Systeme_z5d):

## RESOLUTION  $z^{(5*d)}$ 

Solutions_z5d := solve(Systeme_z5d, Variables_z5d):

assign(Solutions_z5d):

##

```

```

for l from 0 to m - 0*3 do nops(expand(AA||l)) od;
for l from 0 to m - 1*3 do nops(expand(BB||l)) od;
for l from 0 to m - 2*3 do nops(expand(CC||l)) od;
for l from 0 to m - 3*3 do nops(expand(DD||l)) od;

```

```

60894
60894
45382
72398
85728
91217
91742
83770
530
1067
1312
769
1
873
1025

```

(8)

```

> ## SYSTEM FOR DIVISIBILITY BY  $z^{(6*d)}$ 

Systemez6d := {}:

for k from 0 to (m-6)/3 do

Coeffs_z6d[6,m-6-3*k,k] := {coeffs(expand(mtaylor(Eq[6,m-6-3*k,
k], z, 6*d)), [x,y,z]):

```

```
Systemez6d := Systemez6d union Coeffs_z6d[6,m-6-3*k,k]:
```

```
od:
```

```
Systeme_z6d := Systemez6d:
```

```
## VARIABLES FOR DIVISIBILITY BY  $z^{(6*d)}$ 
```

```
Variables_z6d := indets(Systeme_z6d):
```

```
## RESOLUTION  $z^{(6*d)}$ 
```

```
Solutions_z6d := solve(Systeme_z6d, Variables_z6d):
```

```
assign(Solutions_z6d):
```

```
##
```

```
for l from 0 to m - 0*3 do nops(expand(AA||l)) od;
```

```
for l from 0 to m - 1*3 do nops(expand(BB||l)) od;
```

```
for l from 0 to m - 2*3 do nops(expand(CC||l)) od;
```

```
for l from 0 to m - 3*3 do nops(expand(DD||l)) od;
```

60894

1

1

1

1

1

1

1

1

1

1

1

1

2

2

(9)

```
> ## SYSTEM FOR DIVISIBILITY BY  $z^{(7*d)}$ 
```

```
Systemez7d := {}:
```



```

> ## SYSTEM FOR DIVISIBILITY BY  $z^{(8*d)}$ 

Systemez8d := {}:

for k from 0 to (m-8)/3 do

Coeffs_z8d[8,m-8-3*k,k] := {coeffs(expand(mtaylor(Eq[8,m-8-3*k,
k], z, 8*d)), [x,y,z])}:

Systemez8d := Systemez8d union Coeffs_z8d[8,m-8-3*k,k]:

od:

Systeme_z8d := Systemez8d:

## VARIABLES FOR DIVISIBILITY BY  $z^{(8*d)}$ 

Variables_z8d := indets(Systeme_z8d):

## RESOLUTION  $z^{(8*d)}$ 

Solutions_z8d := solve(Systeme_z8d, Variables_z8d):

assign(Solutions_z8d):

##

for l from 0 to m - 0*3 do nops(expand(AA||l)) od;
for l from 0 to m - 1*3 do nops(expand(BB||l)) od;
for l from 0 to m - 2*3 do nops(expand(CC||l)) od;
for l from 0 to m - 3*3 do nops(expand(DD||l)) od;

1
1
1
1
1
1
1
1
1
1
1
1

```

1
1
1

(11)

```
> ## SYSTEM FOR DIVISIBILITY BY  $z^{(9*d)}$ 

Systemez9d := {}:

for k from 0 to (m-9)/3 do

Coeffs_z9d[9,m-9-3*k,k] := {coeffs(expand(mtaylor(Eq[9,m-9-3*k,
k], z, 9*d)), [x,y,z])}:

Systemez9d := Systemez9d union Coeffs_z9d[9,m-9-3*k,k]:

od:

Systeme_z9d := Systemez9d:

## VARIABLES FOR DIVISIBILITY BY  $z^{(9*d)}$ 

Variables_z9d := indets(Systeme_z9d):

## RESOLUTION  $z^{(9*d)}$ 

Solutions_z9d := solve(Systeme_z9d, Variables_z9d):

assign(Solutions_z9d):

##

for l from 0 to m - 0*3 do nops(expand(AA||l)) od;
for l from 0 to m - 1*3 do nops(expand(BB||l)) od;
for l from 0 to m - 2*3 do nops(expand(CC||l)) od;
for l from 0 to m - 3*3 do nops(expand(DD||l)) od;
```

1
1
1
1
1
1
1

1
1
1
1
1
1
1
1

(12)

```
> ## SYSTEM FOR DIVISIBILITY BY  $z^{(10*d)}$ 

Systemez10d := {}:

for k from 0 to (m-10)/3 do

Coeffs_z10d[10,m-10-3*k,k] := {coeffs(expand(mtaylor(Eq[10,m-10-3*k,k], z, 10*d)), [x,y,z])}:

Systemez10d := Systemez10d union Coeffs_z10d[10,m-10-3*k,k]:

od:

Systeme_z10d := Systemez10d:

## VARIABLES FOR DIVISIBILITY BY  $z^{(10*d)}$ 

Variables_z10d := indets(Systeme_z10d):

## RESOLUTION  $z^{(10*d)}$ 

Solutions_z10d := solve(Systeme_z10d, Variables_z10d):

assign(Solutions_z10d):

##

for l from 0 to m - 0*3 do nops(expand(AA||l)) od;
for l from 0 to m - 1*3 do nops(expand(BB||l)) od;
for l from 0 to m - 2*3 do nops(expand(CC||l)) od;
for l from 0 to m - 3*3 do nops(expand(DD||l)) od;
```

1
1

1
1
1
1
1
1
1
1
1
1
1
1

(13)

```
> ## SYSTEM FOR DIVISIBILITY BY  $z^{(11*d)}$ 

Systemez11d := {}:

for k from 0 to (m-11)/3 do

  Coeffs_z11d[11,m-11-3*k,k] := {coeffs(expand(mtaylor(Eq[11,m-11-3*k,k], z, 11*d)), [x,y,z])}:

  Systemez11d := Systemez11d union Coeffs_z11d[11,m-11-3*k,k]:

od:

Systeme_z11d := Systemez11d:

## VARIABLES FOR DIVISIBILITY BY  $z^{(11*d)}$ 

Variables_z11d := indets(Systeme_z11d):

## RESOLUTION  $z^{(11*d)}$ 

Solutions_z11d := solve(Systeme_z11d, Variables_z11d):

assign(Solutions_z11d):

##

for l from 0 to m - 0*3 do nops(expand(AA||l)) od;
```

```

for l from 0 to m - 1*3 do nops(expand(BB||l)) od;
for l from 0 to m - 2*3 do nops(expand(CC||l)) od;
for l from 0 to m - 3*3 do nops(expand(DD||l)) od;

```

```

1
1
1
1
1
1
1
1
1
1
1
1
1
1
1

```

(14)

```

> for l from 0 to m - 0*3 do expand(AA||l) od:
for l from 0 to m - 1*3 do expand(BB||l) od:

```

```

> Jetyx := factor(
+ (1/Rz^(m-0*2)) * add(AA||j * x1^(m-0*3-j) * (y1)^j *
Delta_yx^0, j=0..m-0*3)
+ (1/Rz^(m-1*2)) * add(BB||j * x1^(m-1*3-j) * (y1)^j *
Delta_yx^1, j=0..m-1*3)

```

[) :

[> Vars := indets(Jetyx) minus {x, x1, x2, y, y1, y2, z}:
NbVars := nops(Vars);
NbVars:= 0

(15)