>

Le nouveau coframe initial (chech, désigné par U), s'exprime en fonction du précédent (chapeau, désigné par V) par la relation U:=n.V.

```
> restart :
> with(DifferentialGeometry) :
> with(Tools) : with(LinearAlgebra) :
> DGsetup([w, x, y, z1, z], [a, a1, b, b1], frame1, verbose);
```

The following coordinates have been protected:

[w, x, y, z1, z, a, a1, b, b1]

The following vector fields have been defined and protected:

[D_w, D_x, D_y, D_z1, D_z, D_a, D_a1, D_b, D_b1]

The following differential 1-forms have been defined and protected:

[dw, dx, dy, dz1, dz, da, da1, db, db1]

frame name: frame1 **(1)**

```
frame1 > Der := proc(x) local y; y := op(1, x) : if (type(x, `+`) = true)
    then add(Der(op(i, x)), i = 1 .. nops(x)) elif
        (type(x, `*`) = true) then expand(x/y · Der(y) + y
    · Der(x/y)) elif
        (type(x, `^`) = true) then op(2, x) · y^(op(2, x) - 1)
    · Der(y) elif
        ((type(x, function) = true) or (type(x, symbol)
    = true)) then S^#(x) · W[1] + S(x) · W[2] + Tau(x) · W[3] + L^#(x)
    · W[4] + L(x) · W[5]
            else 0 fi end proc:
```

Les fonctions L et L^#:

```
> L := proc(x) local y; y := op(1, x) : if (type(x, `+`) = true) then add(L(op(i, x)), i = 1
    .. nops(x)) elif
        (type(x, `*`) = true) then expand(L(y) · x/y + y · L(x/y)) elif
        (type(x, `^`) = true) then op(2, x) · y^(op(2, x) - 1) · L(y) elif
        (type(x, function) = true) then 'L'(x) elif
        (type(x, symbol) = true) then 'L'(x) else 0 fi end proc:
```

```
> L^# := proc(x) local y; y := op(1, x) : if (type(x, `+`) = true) then add(L^#(op(i, x)), i = 1
    .. nops(x)) elif
        (type(x, `*`) = true) then expand(L^#(y) · x/y + y · L^#(x/y)) elif
        (type(x, `^`) = true) then op(2, x) · y^(op(2, x) - 1) · L^#(y) elif
        (type(x, function) = true) then 'L^#(x)' elif
        (type(x, symbol) = true) then 'L^#'(x) else 0 fi end proc:
```

où n est la matrice:

```
frame1 > n := Matrix([[1, 0, 0, 0, 0], [0, 1, 0, 0, 0], [0, 0, 1, 0, 0], [E0#, D0, 0, 1,
         0], [D0#, E0, 0, 0, 1]]) :
frame1 > ninv := MatrixInverse(n) :
frame1 > V := ninv.Vector([U[1], U[2], U[3], U[4], U[5]]) :
```

Le coframe chapeau, désigné par V, s'exprime en fonction du coframe initial, W, par la relation V:=m.W.

```
frame1 > m := Matrix([[1, 0, 0, 0, 0], [0, 1, 0, 0, 0], [B, B1, 1, 0, 0], [0, 0, 0, 1,
         0], [0, 0, 0, 0, 1]]) :
frame1 > minv := MatrixInverse(m) :
frame1 > W := minv.Vector([V[1], V[2], V[3], V[4], V[5]]) :
```

On donne ensuite la matrice de groupe:

```
frame2 > Ma := Matrix([[a·a1^2, 0, 0, 0, 0], [0, a^2·a1, 0, 0, 0], [0, 0, a·a1, 0, 0],
         [0, 0, b1, a1, 0], [0, 0, b, 0, a]]);
```

$$Ma := \begin{bmatrix} a\,a1^2 & 0 & 0 & 0 & 0 \\ 0 & a^2\,a1 & 0 & 0 & 0 \\ 0 & 0 & a\,a1 & 0 & 0 \\ 0 & 0 & b1 & a1 & 0 \\ 0 & 0 & b & 0 & a \end{bmatrix} \quad \textbf{(2)}$$

```
frame1 > MaInv := MatrixInverse(Ma) :
M > On determine les formes de Maurer Cartan:
M > Mat := map(evalDG, (ExteriorDerivative(Ma).MaInv));
```

$$Mat := \begin{bmatrix} \frac{da}{a} + \frac{2\,da1}{a1} & 0\,dw & 0\,dw & 0\,dw & 0\,dw \\ 0\,dw & \frac{2\,da}{a} + \frac{da1}{a1} & 0\,dw & 0\,dw & 0\,dw \\ 0\,dw & 0\,dw & \frac{da}{a} + \frac{da1}{a1} & 0\,dw & 0\,dw \\ 0\,dw & 0\,dw & -\frac{b1\,da1}{a\,a1^2} + \frac{db1}{a\,a1} & \frac{da1}{a1} & 0\,dw \\ 0\,dw & 0\,dw & -\frac{b\,da}{a^2\,a1} + \frac{db}{a\,a1} & 0\,dw & \frac{da}{a} \end{bmatrix} \quad \textbf{(3)}$$

frame1 > $t[1] := \frac{da}{a}$:

frame1 > $t[2] := -\frac{b\,da}{a^2\,a1} + \frac{db}{a\,a1}$:

frame1 > $t[3] := \frac{da1}{a1}$:

frame1 > $t[4] := -\frac{b1\,da1}{a\,a1^2} + \frac{db1}{a\,a1}$:

```
M > FD := FrameData([t[1], t[2], t[3], t[4], dw, dx, dy, dz1, dz], frame2) :
```

M > $DGsetup\left(FD, [E], \left[\text{alpha}[1], \text{alpha}[2], \alpha^{\#}[1], \alpha^{\#}[2], \ \sigma^{\#}, \text{sigma}, \text{rho}, \zeta^{\#}, \text{zeta}\right], verbose\right);$

The following coordinates have been protected:

$[w, x, y, z1, z, a, a1, b, b1]$

The following vector fields have been defined and protected:

$[E1, E2, E3, E4, E5, E6, E7, E8, E9]$

The following differential 1-forms have been defined and protected:

$$\left[\alpha_1, \alpha_2, \alpha^{\#}_1, \alpha^{\#}_2, \sigma^{\#}, \sigma, \rho, \zeta^{\#}, \zeta\right]$$

frame name: frame2 **(4)**

Le coframe 'relevé' est noté Y. Il est relié au coframe de base U par la relation Y:=Ma.U.

frame2 > $Y := Vector\left(\left[\sigma^{\#}, \text{sigma}, \text{rho}, \ \zeta^{\#}, \ \text{zeta}\right]\right):$

frame2 > $U := MaInv.Y:$

Les equations de courbure sur les W[i] sont connues :

frame2 > $dW[1] := -K1\cdot(W[1]\&wedge\ W[2]) + F1\cdot(W[1]\&wedge\ W[3]) + Q1\cdot(W[1]\&wedge\ W[4]) + B1\cdot(W[1]\ \&wedge\ \ W[5]) + G\cdot\ (W[2]\ \&wedge\ W[3])\ + B1\cdot(W[2]\ \&wedge\ W[4])\ + R\cdot(W[2]\ \&wedge\ W[5])\ +\ (W[3]\&wedge\ W[4]):$

frame2 > $dW[2] := K\cdot(W[1]\&wedge\ W[2]) + G1\cdot(W[1]\&wedge\ W[3]) + R1\cdot(W[1]\&wedge\ W[4]) + B\cdot(W[1]\ \&wedge\ \ W[5]) + F\cdot\ (W[2]\ \&wedge\ W[3])\ + B\cdot(W[2]\ \&wedge\ W[4]) + Q\cdot(W[2]\ \&wedge\ W[5])\ +\ (W[3]\&wedge\ W[5]):$

frame2 > $dW[3] := I{\cdot}J\cdot(W[1]\&wedge\ W[2]) + E^{\#}\cdot(W[1]\&wedge\ W[3]) + P1\cdot(W[1]\&wedge\ W[4]) + A\cdot(W[1]\ \&wedge\ \ W[5])\ + E\cdot(W[2]\ \&wedge\ W[3])\ + A\cdot(W[2]\ \&wedge\ W[4]) + P\cdot(W[2]\ \&wedge\ W[5])\ -\ I\cdot(W[4]\ \&wedge\ W[5]):$

N > $dW[4] := 0 : dW[5] := 0 :$

frame2 >

On en deduit les equations de courbure sur les V[i]:

frame2 > $dV[1] := dW[1]:$

frame2 > $dV[2] := dW[2]:$

frame2 > $dV[3] := evalDG(dW[3] + (Der(B)\&wedge\ W[1]\ ) + B\cdot dW[1] + (\ Der(B1)\&wedge\ W[2]\ ) + B1\cdot dW[2]):$

frame2 > $dV[4] := dW[4]:$

frame2 > $dV[5] := dW[5]:$

frame1 >

Puis les equations de courbure sur les U[i]:

frame2 > $dU[1] := dV[1]:$

frame2 > $dU[2] := dV[2]:$

frame1 > $dU[3] := dV[3]:$

frame1 > $dU[4] := dV[4] + \left(Der\left(E0^{\#}\right)\&wedge\ V[1]\ \right) + E0^{\#}\cdot dV[1]$

```
+ (Der(D0)&wedge V[2]) + D0·dV[2]:
frame1 > dU[5] := dV[5] + (Der(E0)&wedge V[2]) + E0·dV[2]
         + (Der(D0#)&wedge V[1]) + D0#·dV[1]:
```

On peut maintenant calculer les équations de courbure du coframe 'relevé' :

```
frame2 > Omega := map(evalDG, Ma.Vector([dU[1], dU[2], dU[3], dU[4],
         dU[5]])) :
frame2 > Mat := map(evalDG, (ExteriorDerivative(Ma).MaInv)) :
frame2 > Mat2 := Mat &MatrixWedge Y:
frame2 > SE := map(evalDG, (Mat2 &MatrixPlus Omega)) :
frame2 > List := GenerateForms([alpha[1], alpha[2], α#[1], α#[2], σ#, sigma,
         rho, ζ#, zeta], 2) :
frame2 > Torsion := proc(S, i, j) local k, X; k := 9·(i − 1) - i·(i − 1)/2 + j − i; X
         := GetComponents(S, List); expand(X[k]); end proc:
frame2 > result := proc(l) local k, t, X; X := 0 : t := expand(GetComponents(l,
         List)) : for k from 1 to 36 do X := X + t[k]·List[k] od; X; end proc:
frame2 > result(SE[1]);
```

$$\alpha_1 \wedge \sigma^\# + 2\,\alpha^\#_1 \wedge \sigma^\# + \left(\frac{B\,D0}{a^2\,a1} + \frac{R\,D0^\#}{a^2\,a1} + \frac{G\,B}{a^2\,a1} - \frac{B1\,E0}{a^2\,a1} - \frac{Q1\,D0}{a^2\,a1} - \frac{F1\,B1}{a^2\,a1} - \frac{K1}{a^2\,a1}\right)\sigma^\# \wedge \sigma + \left(\frac{E0^\#}{a1\,a} + \frac{B\,b1}{a\,a1^2} - \frac{B1\,b}{a^2\,a1} - \frac{Q1\,b1}{a\,a1^2} + \frac{F1}{a\,a1}\right)\sigma^\# \wedge \rho + \left(-\frac{B}{a1} + \frac{Q1}{a1}\right)\sigma^\# \wedge \zeta^\# + \frac{B1\,\sigma^\# \wedge \zeta}{a} + \left(\frac{D0}{a^2} - \frac{R\,b}{a^3} + \frac{G}{a^2}\right)\sigma \wedge \rho + \frac{a1\,R\,\sigma \wedge \zeta}{a^2} + \rho \wedge \zeta^\# \tag{5}$$

```
frame1 > result(SE[3]);
```

$$\alpha_1 \wedge \rho + \alpha^\#_1 \wedge \rho + \left(-\frac{B1^2\,D0^\#}{a^2\,a1^2} - \frac{G1\,B1^2}{a^2\,a1^2} + \frac{B1\,K}{a^2\,a1^2} + \frac{\mathrm{T}(B)\,B1}{a^2\,a1^2} + \frac{L^\#(B)\,D0}{a^2\,a1^2} + \frac{L(B)\,E0}{a^2\,a1^2} - \frac{\mathrm{T}(B1)\,B}{a^2\,a1^2} - \frac{L^\#(B1)\,E0^\#}{a^2\,a1^2} - \frac{L(B1)\,D0^\#}{a^2\,a1^2} - \frac{E^\#\,B1}{a^2\,a1^2} - \frac{P1\,D0}{a^2\,a1^2} - \frac{A\,E0}{a^2\,a1^2} + \frac{E\,B}{a^2\,a1^2} + \frac{A\,E0^\#}{a^2\,a1^2} + \frac{P\,D0^\#}{a^2\,a1^2} + \frac{B^2\,D0}{a^2\,a1^2} + \frac{G\,B^2}{a^2\,a1^2} - \frac{B\,K1}{a^2\,a1^2} + \frac{\mathrm{I}\,J}{a^2\,a1^2} + \frac{B1\,Q\,D0^\#}{a^2\,a1^2} + \frac{B1\,B\,E0^\#}{a^2\,a1^2} + \frac{B1\,F\,B}{a^2\,a1^2} - \frac{B1\,R1\,D0}{a^2\,a1^2} + \frac{B\,R\,D0^\#}{a^2\,a1^2} - \frac{B\,B1\,E0}{a^2\,a1^2} - \frac{B\,Q1\,D0}{a^2\,a1^2} - \frac{B\,F1\,B1}{a^2\,a1^2} - \frac{\mathrm{I}\,E0^\#\,E0}{a^2\,a1^2} + \frac{\mathrm{I}\,D0\,D0^\#}{a^2\,a1^2} + \frac{S^\#(B1)}{a^2\,a1^2} - \frac{S(B)}{a^2\,a1^2}\right)\sigma^\# \wedge \sigma + \left(\frac{B1\,D0^\#}{a\,a1^2} - \frac{B1\,R1\,b1}{a\,a1^3} + \frac{B1\,G1}{a\,a1^2} + \frac{B\,E0^\#}{a\,a1^2} + \frac{B^2\,b1}{a\,a1^3} - \frac{B\,B1\,b}{a^2\,a1^2} - \frac{B\,Q1\,b1}{a\,a1^3} + \frac{B\,F1}{a\,a1^2} + \frac{L(B)\,b}{a^2\,a1^2} + \frac{L^\#(B)\,b1}{a\,a1^3} - \frac{\mathrm{T}(B)}{a\,a1^2} + \frac{\mathrm{I}\,b1\,D0^\#}{a\,a1^3} - \frac{\mathrm{I}\,E0^\#\,b}{a^2\,a1^2} - \frac{A\,b}{a^2\,a1^2} - \frac{P1\,b1}{a\,a1^3} + \frac{E^\#}{a\,a1^2}\right)\sigma^\# \wedge \rho + \left(\frac{B1\,R1}{a1^2}\right. \tag{6}$$

$$- \frac{B^2}{a1^2} + \frac{B\,Q1}{a1^2} - \frac{L^{\#}(B)}{a1^2} - \frac{\mathrm{I}\,D0^{\#}}{a1^2} + \frac{P1}{a1^2} \Big) \sigma^{\#} \wedge \zeta^{\#} + \Big(\frac{B\,B1}{a\,a1} - \frac{L(B)}{a\,a1} + \frac{\mathrm{I}\,E0^{\#}}{a\,a1}$$

$$+ \frac{A}{a\,a1} \Big) \sigma^{\#} \wedge \zeta + \Big(\frac{B1\,E0}{a^2\,a1} + \frac{B1^2\,b}{a^3\,a1} - \frac{B1\,Q\,b}{a^3\,a1} - \frac{B1\,B\,b1}{a^2\,a1^2} + \frac{B1\,F}{a^2\,a1} + \frac{L(B1)\,b}{a^3\,a1}$$

$$+ \frac{L^{\#}(B1)\,b1}{a^2\,a1^2} - \frac{\mathrm{T}(B1)}{a^2\,a1} + \frac{B\,D0}{a^2\,a1} - \frac{B\,R\,b}{a^3\,a1} + \frac{G\,B}{a^2\,a1} + \frac{\mathrm{I}\,b1\,E0}{a^2\,a1^2} - \frac{\mathrm{I}\,D0\,b}{a^3\,a1} - \frac{P\,b}{a^3\,a1}$$

$$- \frac{A\,b1}{a^2\,a1^2} + \frac{E}{a^2\,a1} \Big) \sigma \wedge \rho + \Big(\frac{B\,B1}{a\,a1} - \frac{L^{\#}(B1)}{a\,a1} - \frac{\mathrm{I}\,E0}{a\,a1} + \frac{A}{a\,a1} \Big) \sigma \wedge \zeta^{\#} + \Big(- \frac{B1^2}{a^2}$$

$$+ \frac{B1\,Q}{a^2} - \frac{L(B1)}{a^2} + \frac{B\,R}{a^2} + \frac{\mathrm{I}\,D0}{a^2} + \frac{P}{a^2} \Big) \sigma \wedge \zeta + \Big(\frac{B}{a1} - \frac{\mathrm{I}\,b}{a\,a1} \Big) \rho \wedge \zeta^{\#} + \Big(\frac{B1}{a}$$

$$+ \frac{\mathrm{I}\,b1}{a\,a1} \Big) \rho \wedge \zeta - \mathrm{I}\,\zeta^{\#} \wedge \zeta$$

frame2 > *result*(*SE*[5]);

$$\alpha_1 \wedge \zeta + \alpha_2 \wedge \rho + \Big(\frac{b\,A\,E0^{\#}}{a1^3\,a^3} + \frac{b\,P\,D0^{\#}}{a1^3\,a^3} - \frac{b\,G1\,B1^2}{a1^3\,a^3} + \frac{b\,B1\,K}{a1^3\,a^3} - \frac{b\,E^{\#}\,B1}{a1^3\,a^3} - \frac{b\,P1\,D0}{a1^3\,a^3} \qquad \textbf{(7)}$$

$$- \frac{b\,A\,E0}{a1^3\,a^3} + \frac{b\,E\,B}{a1^3\,a^3} - \frac{S(D0^{\#})}{a1^3\,a^2} + \frac{S^{\#}(E0)}{a1^3\,a^2} + \frac{b\,B1\,Q\,D0^{\#}}{a1^3\,a^3} + \frac{b\,B1\,B\,E0^{\#}}{a1^3\,a^3} + \frac{b\,B1\,F\,B}{a1^3\,a^3}$$

$$- \frac{b\,B1\,R1\,D0}{a1^3\,a^3} + \frac{b\,B\,R\,D0^{\#}}{a1^3\,a^3} - \frac{b\,B\,B1\,E0}{a1^3\,a^3} - \frac{b\,B\,Q1\,D0}{a1^3\,a^3} - \frac{b\,B\,F1\,B1}{a1^3\,a^3} - \frac{\mathrm{I}\,b\,E0^{\#}\,E0}{a1^3\,a^3}$$

$$+ \frac{\mathrm{I}\,b\,D0\,D0^{\#}}{a1^3\,a^3} + \frac{R\,D0^{\#2}}{a1^3\,a^2} - \frac{D0^{\#}\,K1}{a1^3\,a^2} + \frac{E0\,K}{a1^3\,a^2} + \frac{L(D0^{\#})\,E0}{a1^3\,a^2} + \frac{L^{\#}(D0^{\#})\,D0}{a1^3\,a^2}$$

$$+ \frac{\mathrm{T}(D0^{\#})\,B1}{a1^3\,a^2} - \frac{L(E0)\,D0^{\#}}{a1^3\,a^2} - \frac{L^{\#}(E0)\,E0^{\#}}{a1^3\,a^2} - \frac{\mathrm{T}(E0)\,B}{a1^3\,a^2} + \frac{b\,S^{\#}(B1)}{a1^3\,a^3} - \frac{b\,S(B)}{a1^3\,a^3}$$

$$- \frac{b\,\mathrm{T}(B1)\,B}{a1^3\,a^3} - \frac{b\,L^{\#}(B1)\,E0^{\#}}{a1^3\,a^3} - \frac{b\,L(B1)\,D0^{\#}}{a1^3\,a^3} + \frac{b\,\mathrm{T}(B)\,B1}{a1^3\,a^3} + \frac{b\,L^{\#}(B)\,D0}{a1^3\,a^3}$$

$$+ \frac{b\,L(B)\,E0}{a1^3\,a^3} - \frac{b\,B1^2\,D0^{\#}}{a1^3\,a^3} + \frac{D0^{\#}\,B\,D0}{a1^3\,a^2} + \frac{D0^{\#}\,G\,B}{a1^3\,a^2} - \frac{2\,E0\,B1\,D0^{\#}}{a1^3\,a^2} - \frac{D0^{\#}\,Q1\,D0}{a1^3\,a^2}$$

$$- \frac{D0^{\#}\,F1\,B1}{a1^3\,a^2} + \frac{E0\,Q\,D0^{\#}}{a1^3\,a^2} + \frac{E0\,B\,E0^{\#}}{a1^3\,a^2} + \frac{E0\,F\,B}{a1^3\,a^2} - \frac{E0\,R1\,D0}{a1^3\,a^2} - \frac{E0\,G1\,B1}{a1^3\,a^2}$$

$$+ \frac{\mathrm{I}\,b\,J}{a1^3\,a^3} - \frac{b\,B\,K1}{a1^3\,a^3} + \frac{b\,B^2\,D0}{a1^3\,a^3} + \frac{b\,G\,B^2}{a1^3\,a^3} \Big) \sigma^{\#} \wedge \sigma + \Big(- \frac{\mathrm{T}(D0^{\#})}{a\,a1^3} - \frac{b\,B1\,R1\,b1}{a^2\,a1^4}$$

$$- \frac{b\,B\,Q1\,b1}{a^2\,a1^4} + \frac{\mathrm{I}\,b\,b1\,D0^{\#}}{a^2\,a1^4} + \frac{D0^{\#}\,E0^{\#}}{a\,a1^3} + \frac{D0^{\#}\,F1}{a\,a1^3} + \frac{E0\,D0^{\#}}{a\,a1^3} + \frac{E0\,G1}{a\,a1^3} + \frac{b\,E^{\#}}{a^2\,a1^3}$$

$$+ \frac{L(D0^{\#})\,b}{a^2\,a1^3} - \frac{b\,\mathrm{T}(B)}{a^2\,a1^3} - \frac{A\,b^2}{a^3\,a1^3} + \frac{L^{\#}(D0^{\#})\,b1}{a\,a1^4} + \frac{L(B)\,b^2}{a^3\,a1^3} + \frac{D0^{\#}\,B\,b1}{a\,a1^4}$$

$$
-\frac{D0^{\#}\,Q1\,b1}{a\,a1^{4}}-\frac{E0\,R1\,b1}{a\,a1^{4}}+\frac{b\,B^{2}\,b1}{a^{2}\,a1^{4}}-\frac{B\,B1\,b^{2}}{a^{3}\,a1^{3}}-\frac{b\,P1\,b1}{a^{2}\,a1^{4}}+\frac{b\,L^{\#}(B)\,b1}{a^{2}\,a1^{4}}
+\frac{b\,B1\,G1}{a^{2}\,a1^{3}}+\frac{b\,B\,E0^{\#}}{a^{2}\,a1^{3}}+\frac{b\,B\,F1}{a^{2}\,a1^{3}}-\frac{\mathrm{I}\,E0^{\#}\,b^{2}}{a^{3}\,a1^{3}}\Bigg)\,\sigma^{\#}\wedge\rho+\Bigg(-\frac{D0^{\#}\,B}{a1^{3}}+\frac{D0^{\#}\,Q1}{a1^{3}}
-\frac{L^{\#}(D0^{\#})}{a1^{3}}+\frac{E0\,R1}{a1^{3}}+\frac{b\,B1\,R1}{a\,a1^{3}}-\frac{b\,B^{2}}{a\,a1^{3}}+\frac{b\,B\,Q1}{a\,a1^{3}}-\frac{b\,L^{\#}(B)}{a\,a1^{3}}-\frac{\mathrm{I}\,b\,D0^{\#}}{a\,a1^{3}}
+\frac{b\,P1}{a\,a1^{3}}\Bigg)\,\sigma^{\#}\wedge\zeta^{\#}+\Bigg(\frac{B1\,D0^{\#}}{a\,a1^{2}}-\frac{L(D0^{\#})}{a\,a1^{2}}+\frac{B\,B1\,b}{a^{2}\,a1^{2}}-\frac{L(B)\,b}{a^{2}\,a1^{2}}+\frac{\mathrm{I}\,b\,E0^{\#}}{a^{2}\,a1^{2}}
+\frac{A\,b}{a^{2}\,a1^{2}}\Bigg)\,\sigma^{\#}\wedge\zeta+\Bigg(\frac{E0^{2}}{a^{2}\,a1^{2}}-\frac{\mathrm{T}(E0)}{a^{2}\,a1^{2}}-\frac{b\,B1\,B\,b1}{a^{3}\,a1^{3}}+\frac{\mathrm{I}\,b\,b1\,E0}{a^{3}\,a1^{3}}+\frac{B1^{2}\,b^{2}}{a^{4}\,a1^{2}}
-\frac{P\,b^{2}}{a^{4}\,a1^{2}}+\frac{L^{\#}(E0)\,b1}{a^{2}\,a1^{3}}+\frac{L(B1)\,b^{2}}{a^{4}\,a1^{2}}+\frac{D0^{\#}\,D0}{a^{2}\,a1^{2}}+\frac{D0^{\#}\,G}{a^{2}\,a1^{2}}+\frac{E0\,F}{a^{2}\,a1^{2}}+\frac{b\,E}{a^{3}\,a1^{2}}
+\frac{L(E0)\,b}{a^{3}\,a1^{2}}-\frac{b\,\mathrm{T}(B1)}{a^{3}\,a1^{2}}-\frac{D0^{\#}\,R\,b}{a^{3}\,a1^{2}}+\frac{2\,E0\,B1\,b}{a^{3}\,a1^{2}}-\frac{E0\,Q\,b}{a^{3}\,a1^{2}}+\frac{b\,B1\,F}{a^{3}\,a1^{2}}+\frac{b\,B\,D0}{a^{3}\,a1^{2}}
+\frac{b\,B\,G}{a^{3}\,a1^{2}}-\frac{E0\,B\,b1}{a^{2}\,a1^{3}}-\frac{B1\,Q\,b^{2}}{a^{4}\,a1^{2}}-\frac{B\,R\,b^{2}}{a^{4}\,a1^{2}}-\frac{b\,A\,b1}{a^{3}\,a1^{3}}+\frac{b\,L^{\#}(B1)\,b1}{a^{3}\,a1^{3}}-\frac{\mathrm{I}\,D0\,b^{2}}{a^{4}\,a1^{2}}\Bigg)
\sigma\wedge\rho+\Bigg(\frac{B\,E0}{a\,a1^{2}}-\frac{L^{\#}(E0)}{a\,a1^{2}}+\frac{B\,B1\,b}{a^{2}\,a1^{2}}-\frac{b\,L^{\#}(B1)}{a^{2}\,a1^{2}}-\frac{\mathrm{I}\,b\,E0}{a^{2}\,a1^{2}}+\frac{A\,b}{a^{2}\,a1^{2}}\Bigg)\,\sigma\wedge\zeta^{\#}
+\Bigg(\frac{R\,D0^{\#}}{a^{2}\,a1}-\frac{B1\,E0}{a^{2}\,a1}+\frac{E0\,Q}{a^{2}\,a1}-\frac{L(E0)}{a^{2}\,a1}-\frac{B1^{2}\,b}{a^{3}\,a1}+\frac{B1\,Q\,b}{a^{3}\,a1}-\frac{L(B1)\,b}{a^{3}\,a1}+\frac{B\,R\,b}{a^{3}\,a1}
+\frac{\mathrm{I}\,b\,D0}{a^{3}\,a1}+\frac{P\,b}{a^{3}\,a1}\Bigg)\,\sigma\wedge\zeta+\Bigg(\frac{D0^{\#}}{a1^{2}}+\frac{b\,B}{a\,a1^{2}}-\frac{\mathrm{I}\,b^{2}}{a^{2}\,a1^{2}}\Bigg)\,\rho\wedge\zeta^{\#}+\Bigg(\frac{E0}{a\,a1}+\frac{B1\,b}{a^{2}\,a1}
+\frac{\mathrm{I}\,b\,b1}{a^{2}\,a1^{2}}\Bigg)\,\rho\wedge\zeta-\frac{\mathrm{I}\,b\,\zeta^{\#}\wedge\zeta}{a\,a1}
$$

frame2 > *result*(*SE*[2]);

$$
2\,\alpha_{1}\wedge\sigma+\alpha^{\#}_{1}\wedge\sigma+\Bigg(-\frac{B1\,D0^{\#}}{a\,a1^{2}}+\frac{Q\,D0^{\#}}{a\,a1^{2}}+\frac{B\,E0^{\#}}{a\,a1^{2}}+\frac{F\,B}{a\,a1^{2}}-\frac{R1\,D0}{a\,a1^{2}}-\frac{B1\,G1}{a\,a1^{2}}
+\frac{K}{a\,a1^{2}}\Bigg)\,\sigma^{\#}\wedge\sigma+\Bigg(\frac{D0^{\#}}{a1^{2}}-\frac{R1\,b1}{a1^{3}}+\frac{G1}{a1^{2}}\Bigg)\,\sigma^{\#}\wedge\rho+\frac{a\,R1\,\sigma^{\#}\wedge\zeta^{\#}}{a1^{2}}+\Bigg(\frac{E0}{a\,a1}
+\frac{B1\,b}{a^{2}\,a1}-\frac{Q\,b}{a^{2}\,a1}-\frac{B\,b1}{a\,a1^{2}}+\frac{F}{a\,a1}\Bigg)\,\sigma\wedge\rho+\frac{B\,\sigma\wedge\zeta^{\#}}{a1}+\Bigg(-\frac{B1}{a}+\frac{Q}{a}\Bigg)\,\sigma\wedge\zeta
+\rho\wedge\zeta \qquad \textbf{(8)}
$$

frame2 >