```
> restart :
> with(DifferentialGeometry) :
> with(Tools) : with(LinearAlgebra) :
> DGsetup([w, x, y, z, z1], M, verbose);
```

The following coordinates have been protected:

$[w, x, y, z, z1]$

The following vector fields have been defined and protected:

$[D\_w, D\_x, D\_y, D\_z, D\_z1]$

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

$[dw, dx, dy, dz, dz1]$

frame name: M **(1)**

Une procédure de dérivation:

```
> Der := proc(x) evalDG( R(x)&wedge W[1] + S(x)&wedge W[2] + Tau(x)&wedge W[3]
      + L(x)&wedge W[4] + L#(x) &wedge W[5]); end proc:

> Tau := proc(x) I·(L(L#(x)) − L#(L(x))) 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:

> 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:

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

```
                (type(x, symbol) = true)  then 'R'(x) else 0 fi end proc:
N >
    conj := proc(x) local y; y := op(1, x) : if (type(x, `+`) = true) then add(conj(op(i,
        x)), i = 1 .. nops(x)) elif
                (type(x, `*`) = true) then simplify(conj(y)·conj(x/y)) elif
                (type(x, `^`) = true) then conj(y)^op(2, x)  elif  (type(x , complex)
        = true) then conjugate(x)  elif
                x = Qr then Qr^# elif x = Pr then  Pr^# elif x = B then B^# elif x = A
        then A^#
                elif x = Qr^# then Qr elif x = Pr^# then Pr elif x = A^# then A  elif x = B^#
        then B
            elif x = Tr then Tr^# elif x = Tr^# then Tr  elif x = Sr then Sr^# elif x = Sr^# then Sr
        elif x = Rr then Rr^# elif x = Rr^# then Rr
            elif x = Lr then Lr^# elif x = Lr^# then Lr  elif x = Mr then Mr^# elif x = Mr^# then Mr
        elif x = Nr then Nr^# elif x = Nr^# then Nr
        elif x = OR then OR^# elif x = OR^# then OR  elif x = E then E^# elif x = E^# then E  elif x
        = F then F^# elif x = F^# then F
    elif x = G then G^# elif x = G^# then G  elif x = H then H^# elif x = H^# then H  elif x = J
        then J^# elif x = J^# then J
    elif x = K then K^# elif x = K^# then K elif x = F0 then F1 elif  x = F1 then F0 elif x = B0
        then B1 elif x = B1 then B0 elif x = C0 then C1 elif x = C1 then C0 elif x = g
    then g1 elif x = g1 then g
    elif x = a then a elif  x = d then d1 elif x = d1 then d elif(type(x, function) = true)  then
        if op(0, x) = L then (L^#(conj(y)) ) elif op(0, x) = L^# then (L(conj(y)) )  elif op(0,
        x) = S then S^#(y) elif op(0, x) = R then R^#(y) end if  end if ;end proc:
N > conjugue := proc(x) ; expand(Sub(conj(x))) end proc:
> Sub := proc(s); if (type(s, `+`) = true) then add(Sub(op(i, s)), i = 1 .. nops(s))
                elif (type(s, `^`)and op(2, s) < 0 ) = true
    then 1/substitution(op(1, s)^-op(2, s))  elif  (type(s, `*`) = true) then Sub(op(1, s))
    ·Sub(s/op(1, s)) else substitution(s)  fi end proc: substitution := proc(s) ;
    subs(sqrt(1/B) = 1/sqrt(B), s) end proc:
N >
M > S^# := proc(x); A·Tau(x) + B·S(x); end proc;
                S^# := proc(x) A * T(x) + B * S(x) end proc                    (2)
M > R^# := proc(x); (L^#(A) + B·L(A) + A^2)·Tau(x) + (L^#(B) + B·L(B) + 2·A·B)·S(x)
            + B^2·R(x) end proc;
R^# := proc(x)                                                                 (3)
    (L^#(A) + B * L(A) + A^2) * T(x) + (L^#(B) + B * L(B) + 2 * A * B) * S(x) + B^2 * R(x)
end proc
```

```
> B# := 1/B : A# := -B#·A :
> W := Vector([dw, dx, dy, dz, dz1]) :
> dW[1] := evalDG(Tr·(W[1]&wedge W[2]) + Qr·(W[1]&wedge W[3]) + K·(W[1]
      &wedge W[5]) + G·(W[1] &wedge W[4]) + Nr·(W[2] &wedge W[3]) + B
      ·(W[2] &wedge W[5]) + (W[2] &wedge W[4])) :
> dW[2] := evalDG(Sr·(W[1]&wedge W[2]) + Pr·(W[1]&wedge W[3]) + J·(W[1]
      &wedge W[5]) + F·(W[1] &wedge W[4]) + Mr·(W[2] &wedge W[3])
      + (L(B) + A)·(W[2] &wedge W[5]) + B·(W[3] &wedge W[5]) + (W[3]
      &wedge W[4])) :
> dW[3] := evalDG(Rr·(W[1]&wedge W[2]) + OR·(W[1]&wedge W[3]) + H·(W[1]
      &wedge W[5]) + E·(W[1] &wedge W[4]) + Lr·(W[2] &wedge W[3]) + L(A)
      ·(W[2] &wedge W[5]) + A·(W[3] &wedge W[5]) + I·(W[4] &wedge W[5])) :
> dW[4] := evalDG(0 &wedge dx &wedge dy) :
> dW[5] := evalDG(0 &wedge dx &wedge dy) :
> dW#[1] := evalDG(Der((B#)^2)&wedge W[1] + (B#)^2&wedge dW[1]);
```

$$dW^{\#}_1 := \frac{(Tr\,B + 2\,S(B))\,dw \wedge dx}{B^3} + \frac{(Qr\,B + 2\,I\,L(L^{\#}(B)) - 2\,I\,L^{\#}(L(B)))\,dw \wedge dy}{B^3} + \frac{(G\,B + 2\,L(B))\,dw \wedge dz}{B^3} + \frac{(K\,B + 2\,L^{\#}(B))\,dw \wedge dz1}{B^3} + \frac{Nr\,dx \wedge dy}{B^2} + \frac{dx \wedge dz}{B^2} + \frac{dx \wedge dz1}{B} \tag{4}$$

```
> List2 := GenerateForms([dw, dx, dy, dz, dz1], 2) :
> W#[1] := 1/B^2·W[1];
```

$$W^{\#}_1 := \frac{dw}{B^2} \tag{5}$$

```
> W#[3] := W[3] + A#·W[2] + (conjugue(L#(A) + B·L(A) + A^2))·W[1];
```

$$W^{\#}_3 := dy - \frac{A\,dx}{B} + \left(\frac{L(B)\,A}{B^2} - \frac{L(A)}{B} + \frac{L^{\#}(B)\,A}{B^3} - \frac{L^{\#}(A)}{B^2} + \frac{A^2}{B^2}\right) dw \tag{6}$$

```
> W#[2] := B#·W[2] + (conjugue(L#(B) + B·L(B) + 2·A·B))·W[1];
```

$$W^{\#}_2 := \frac{dx}{B} + \left(-\frac{L(B)}{B^2} - \frac{L^{\#}(B)}{B^3} - \frac{2\,A}{B^2}\right) dw \tag{7}$$

```
> ConjugueForm := proc(omega) local Int; Int := GetComponents(omega, List2) :
    evalDG(add(conjugue(Int[i])&wedge W#[tr1(i)] &wedge W#[tr2(i)], i = 1..10));
    end proc:
> W#[4] := W[5] :
> W#[5] := W[4] :
> tr1(1) := 1 :
> tr1(2) := 1 :
> tr1(3) := 1 :
> tr1(4) := 1 :
```

```
> tr1(5) := 2:
> tr1(6) := 2:
> tr1(7) := 2:
> tr1(8) := 3:
> tr1(9) := 3:
> tr1(10) := 4:
> tr2(1) := 2:
> tr2(2) := 3:
> tr2(3) := 4:
> tr2(4) := 5:
> tr2(5) := 3:
> tr2(6) := 4:
> tr2(7) := 5:
> tr2(8) := 4:
> tr2(9) := 5:
> tr2(10) := 5:
>
> ConjugueForm(dW[1]);
```

$$\frac{\left(Nr^{\#}\,L(A)\,B + Nr^{\#}\,L^{\#}(A) + Nr^{\#}\,A^2 - Qr^{\#}\,A + Tr^{\#}\right)\,dw \wedge dx}{B^3} - \frac{\left(Nr^{\#}\,L(B)\,B + Nr^{\#}\,L^{\#}(B) + 2\,Nr^{\#}\,A\,B - Qr^{\#}\,B\right)\,dw \wedge dy}{B^3} - \frac{\left(B\,L(B) + L^{\#}(B) + 2\,A\,B - K^{\#}\,B^2\right)\,dw \wedge dz}{B^4} - \frac{\left(B\,L(B) + L^{\#}(B) + 2\,A\,B - G^{\#}\,B\right)\,dw \wedge dz1}{B^3} + \frac{Nr^{\#}\,dx \wedge dy}{B} + \frac{dx \wedge dz}{B^2} + \frac{dx \wedge dz1}{B} \tag{8}$$

```
> ConjugueForm(W[2]&wedge W[4]);
```

$$-\frac{\left(L^{\#}(B) + B\,L(B) + 2\,A\,B\right)\,dw \wedge dz1}{B^3} + \frac{dx \wedge dz1}{B} \tag{9}$$

```
> dW[1];
```

$$Tr\,dw \wedge dx + Qr\,dw \wedge dy + G\,dw \wedge dz + K\,dw \wedge dz1 + Nr\,dx \wedge dy + dx \wedge dz + B\,dx \wedge dz1 \tag{10}$$

```
> ConjugueForm(dW[1]);
```

$$\frac{\left(Nr^{\#}\,L(A)\,B + Nr^{\#}\,L^{\#}(A) + Nr^{\#}\,A^2 - Qr^{\#}\,A + Tr^{\#}\right)\,dw \wedge dx}{B^3} - \frac{\left(Nr^{\#}\,L(B)\,B + Nr^{\#}\,L^{\#}(B) + 2\,Nr^{\#}\,A\,B - Qr^{\#}\,B\right)\,dw \wedge dy}{B^3} - \frac{\left(B\,L(B) + L^{\#}(B) + 2\,A\,B - K^{\#}\,B^2\right)\,dw \wedge dz}{B^4} \tag{11}$$

$$-\frac{(B\,L(B)+L^{\#}(B)+2\,A\,B-G^{\#}\,B)\,dw\wedge dz1}{B^3}+\frac{Nr^{\#}\,dx\wedge dy}{B}+\frac{dx\wedge dz}{B^2}+\frac{dx\wedge dz1}{B}$$

```
> exp2 := (conjugue(L^#(B) + B·L(B) + 2·A·B)) :
> dW^#[2] := evalDG(Der(B^#) &wedge W[2] + B^#·dW[2] + Der(exp2) &wedge W[1]
      + exp2·dW[1]) :
> exp3 := conjugue(L^#(A) + B·L(A) + A^2) :
> dW^#[3] := evalDG(dW[3] + Der(A^#) &wedge W[2] + A^#·dW[2] + Der(exp3)
      &wedge W[1] + exp3·dW[1]) :
> for i from 1 to 3 do Res1[i] := GetComponents(dW^#[i], List2); od:
> for i from 1 to 3 do Res2[i] := GetComponents(ConjugueForm(dW[i]), List2); od:
> Equations := proc(j) local i; for i from 1 to 10 do print(expand(Res1[j][i]
      - Res2[j][i]) = 0); od; end proc;
```

$$\begin{aligned}&Equations := \mathbf{proc}(j)\\&\quad \mathbf{local}\ i;\\&\quad \mathbf{for}\ i\ \mathbf{to}\ 10\ \mathbf{do}\\&\qquad print(expand(Res1[j][i]-Res2[j][i])=0)\\&\quad \mathbf{end\ do}\\&\mathbf{end\ proc}\end{aligned}\tag{12}$$

```
> Equations(1);
```

$$\frac{Tr}{B^2}+\frac{2\,S(B)}{B^3}-\frac{Nr^{\#}\,L(A)}{B^2}-\frac{Nr^{\#}\,L^{\#}(A)}{B^3}-\frac{Nr^{\#}\,A^2}{B^3}+\frac{Qr^{\#}\,A}{B^3}-\frac{Tr^{\#}}{B^3}=0$$

$$\frac{Qr}{B^2}+\frac{2\,I\,L(L^{\#}(B))}{B^3}-\frac{2\,I\,L^{\#}(L(B))}{B^3}+\frac{Nr^{\#}\,L(B)}{B^2}+\frac{Nr^{\#}\,L^{\#}(B)}{B^3}+\frac{2\,Nr^{\#}\,A}{B^2}-\frac{Qr^{\#}}{B^2}=0$$

$$\frac{G}{B^2}+\frac{3\,L(B)}{B^3}+\frac{L^{\#}(B)}{B^4}+\frac{2\,A}{B^3}-\frac{K^{\#}}{B^2}=0$$

$$\frac{K}{B^2}+\frac{3\,L^{\#}(B)}{B^3}+\frac{L(B)}{B^2}+\frac{2\,A}{B^2}-\frac{G^{\#}}{B^2}=0$$

$$\frac{Nr}{B^2}-\frac{Nr^{\#}}{B}=0$$

$$0=0$$
$$0=0$$
$$0=0$$
$$0=0$$
$$0=0$$

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```
> Equations(2);
```

$$-\frac{Tr\,L(B)}{B^2}-\frac{Tr\,L^{\#}(B)}{B^3}-\frac{2\,Tr\,A}{B^2}-\frac{2\,S(B)\,L(B)}{B^3}+\frac{S(L(B))}{B^2}-\frac{3\,S(B)\,L^{\#}(B)}{B^4}$$

$$+\frac{S(L^{\#}(B))}{B^3}-\frac{4\,S(B)\,A}{B^3}+\frac{2\,S(A)}{B^2}+\frac{Sr}{B}-\frac{R(B)}{B^2}-\frac{Mr^{\#}\,L(A)}{B^2}-\frac{Mr^{\#}\,L^{\#}(A)}{B^3}$$
$$-\frac{Mr^{\#}\,A^2}{B^3}+\frac{Pr^{\#}\,A}{B^3}-\frac{Sr^{\#}}{B^3}=0$$
$$-\frac{Qr\,L(B)}{B^2}-\frac{Qr\,L^{\#}(B)}{B^3}-\frac{2\,Qr\,A}{B^2}-\frac{2\,\mathrm{I}\,L(B)\,L(L^{\#}(B))}{B^3}-\frac{4\,\mathrm{I}\,L(L^{\#}(B))\,A}{B^3}$$
$$-\frac{\mathrm{I}\,L^{\#}(L(L^{\#}(B)))}{B^3}-\frac{2\,\mathrm{I}\,L^{\#}(L(A))}{B^2}+\frac{\mathrm{I}\,L(L^{\#}(L(B)))}{B^2}+\frac{\mathrm{I}\,L(L^{\#}(L^{\#}(B)))}{B^3}$$
$$+\frac{3\,\mathrm{I}\,L^{\#}(L(B))\,L^{\#}(B)}{B^4}+\frac{2\,\mathrm{I}\,L(B)\,L^{\#}(L(B))}{B^3}-\frac{3\,\mathrm{I}\,L^{\#}(B)\,L(L^{\#}(B))}{B^4}+\frac{2\,\mathrm{I}\,L(L^{\#}(A))}{B^2}$$
$$-\frac{\mathrm{I}\,L^{\#}(L(L(B)))}{B^2}+\frac{4\,\mathrm{I}\,L^{\#}(L(B))\,A}{B^3}+\frac{Pr}{B}+\frac{Mr^{\#}\,L(B)}{B^2}+\frac{Mr^{\#}\,L^{\#}(B)}{B^3}+\frac{2\,Mr^{\#}\,A}{B^2}$$
$$-\frac{Pr^{\#}}{B^2}=0$$
$$-\frac{G\,L(B)}{B^2}-\frac{G\,L^{\#}(B)}{B^3}-\frac{2\,G\,A}{B^2}-\frac{2\,L(B)^2}{B^3}+\frac{L(L(B))}{B^2}-\frac{4\,L(B)\,L^{\#}(B)}{B^4}+\frac{L(L^{\#}(B))}{B^3}$$
$$-\frac{6\,L(B)\,A}{B^3}+\frac{3\,L(A)}{B^2}+\frac{F}{B}-\frac{4\,L^{\#}(B)\,A}{B^4}+\frac{L^{\#}(A)}{B^3}-\frac{3\,A^2}{B^3}-\frac{L^{\#}(B)^2}{B^5}-\frac{J^{\#}}{B^2}=0$$
$$-\frac{K\,L(B)}{B^2}-\frac{K\,L^{\#}(B)}{B^3}-\frac{2\,K\,A}{B^2}-\frac{2\,L(B)\,L^{\#}(B)}{B^3}+\frac{L^{\#}(L(B))}{B^2}-\frac{3\,L^{\#}(B)^2}{B^4}+\frac{L^{\#}(L^{\#}(B))}{B^3}$$
$$-\frac{5\,L^{\#}(B)\,A}{B^3}+\frac{3\,L^{\#}(A)}{B^2}+\frac{J}{B}-\frac{L(B)\,A}{B^2}+\frac{L(A)}{B}-\frac{A^2}{B^2}-\frac{F^{\#}}{B^2}=0$$
$$-\frac{Nr\,L(B)}{B^2}-\frac{Nr\,L^{\#}(B)}{B^3}-\frac{2\,Nr\,A}{B^2}+\frac{Mr}{B}+\frac{\mathrm{I}\,L(L^{\#}(B))}{B^2}-\frac{\mathrm{I}\,L^{\#}(L(B))}{B^2}-\frac{Mr^{\#}}{B}=0$$

$$0=0$$
$$0=0$$
$$0=0$$
$$0=0$$
$$0=0$$

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M > *Equations*(3);

$$-\frac{Lr^{\#}\,L(A)}{B^2}+\frac{OR^{\#}\,A}{B^3}+Rr+\frac{R(B)\,A}{B^2}-\frac{R(A)}{B}-\frac{Rr^{\#}}{B^3}+\frac{S(L(A))}{B}+\frac{S(L^{\#}(A))}{B^2}$$
$$-\frac{2\,S(B)\,L^{\#}(A)}{B^3}+\frac{2\,S(B)\,A^2}{B^3}-\frac{S(B)\,L(A)}{B^2}-\frac{2\,A\,S(A)}{B^2}-\frac{Lr^{\#}\,A^2}{B^3}-\frac{L^{\#}(B)\,S(A)}{B^3}$$
$$-\frac{S(L(B))\,A}{B^2}-\frac{Tr\,L^{\#}(A)}{B^2}-\frac{S(L^{\#}(B))\,A}{B^3}-\frac{Lr^{\#}\,L^{\#}(A)}{B^3}+\frac{Tr\,A^2}{B^2}-\frac{L(B)\,S(A)}{B^2}$$

$$-\frac{Tr\,L(A)}{B}+\frac{Tr\,L(B)\,A}{B^2}+\frac{Tr\,L^{\#}(B)\,A}{B^3}+\frac{2\,S(B)\,L(B)\,A}{B^3}+\frac{3\,S(B)\,L^{\#}(B)\,A}{B^4}$$

$$-\frac{A\,Sr}{B}=0$$

$$OR+\frac{2\,\mathrm{I}\,L(B)\,L\left(L^{\#}(B)\right)A}{B^3}-\frac{2\,\mathrm{I}\,L(B)\,L^{\#}(L(B))\,A}{B^3}+\frac{3\,\mathrm{I}\,L^{\#}(B)\,L\left(L^{\#}(B)\right)A}{B^4}$$

$$-\frac{3\,\mathrm{I}\,L^{\#}(L(B))\,L^{\#}(B)\,A}{B^4}-\frac{Qr\,L^{\#}(A)}{B^2}-\frac{OR^{\#}}{B^2}-\frac{Qr\,L(A)}{B}+\frac{2\,Lr^{\#}\,A}{B^2}$$

$$+\frac{\mathrm{I}\,L\left(L^{\#}(L(A))\right)}{B}+\frac{Lr^{\#}\,L^{\#}(B)}{B^3}+\frac{Lr^{\#}\,L(B)}{B^2}+\frac{Qr\,A^2}{B^2}-\frac{\mathrm{I}\,L^{\#}\left(L\left(L^{\#}(A)\right)\right)}{B^2}$$

$$+\frac{\mathrm{I}\,L\left(L^{\#}\left(L^{\#}(A)\right)\right)}{B^2}-\frac{\mathrm{I}\,L^{\#}(L(L(A)))}{B}+\frac{Qr\,L(B)\,A}{B^2}+\frac{Qr\,L^{\#}(B)\,A}{B^3}$$

$$+\frac{\mathrm{I}\,L^{\#}(L(L(B)))\,A}{B^2}+\frac{\mathrm{I}\,L^{\#}\left(L\left(L^{\#}(B)\right)\right)A}{B^3}+\frac{\mathrm{I}\,L^{\#}(L(B))\,L(A)}{B^2}+\frac{\mathrm{I}\,L(B)\,L^{\#}(L(A))}{B^2}$$

$$+\frac{\mathrm{I}\,L^{\#}(B)\,L^{\#}(L(A))}{B^3}-\frac{\mathrm{I}\,L\left(L^{\#}(B)\right)L(A)}{B^2}-\frac{\mathrm{I}\,L\left(L^{\#}(L(B))\right)A}{B^2}+\frac{2\,\mathrm{I}\,L\left(L^{\#}(B)\right)A^2}{B^3}$$

$$-\frac{\mathrm{I}\,L(B)\,L\left(L^{\#}(A)\right)}{B^2}-\frac{\mathrm{I}\,L\left(L^{\#}\left(L^{\#}(B)\right)\right)A}{B^3}-\frac{2\,\mathrm{I}\,L\left(L^{\#}(B)\right)L^{\#}(A)}{B^3}$$

$$-\frac{\mathrm{I}\,L^{\#}(B)\,L\left(L^{\#}(A)\right)}{B^3}-\frac{2\,\mathrm{I}\,A\,L\left(L^{\#}(A)\right)}{B^2}+\frac{2\,\mathrm{I}\,L^{\#}(L(B))\,L^{\#}(A)}{B^3}-\frac{2\,\mathrm{I}\,L^{\#}(L(B))\,A^2}{B^3}$$

$$+\frac{2\,\mathrm{I}\,A\,L^{\#}(L(A))}{B^2}-\frac{A\,Pr}{B}=0$$

$$E-\frac{H^{\#}}{B^2}+\frac{A^3}{B^3}+\frac{L(L(A))}{B}+\frac{L\left(L^{\#}(A)\right)}{B^2}-\frac{L\left(L^{\#}(B)\right)A}{B^3}-\frac{L^{\#}(B)\,L(A)}{B^3}+\frac{2\,L(B)^2\,A}{B^3}$$

$$+\frac{L^{\#}(B)^2\,A}{B^5}-\frac{2\,L(B)\,L(A)}{B^2}+\frac{3\,L^{\#}(B)\,A^2}{B^4}+\frac{G\,A^2}{B^2}-\frac{L(L(B))\,A}{B^2}-\frac{3\,A\,L(A)}{B^2}$$

$$-\frac{G\,L(A)}{B}-\frac{3\,L(B)\,L^{\#}(A)}{B^3}-\frac{L^{\#}(B)\,L^{\#}(A)}{B^4}-\frac{3\,A\,L^{\#}(A)}{B^3}+\frac{3\,L(B)\,A^2}{B^3}-\frac{G\,L^{\#}(A)}{B^2}$$

$$+\frac{G\,L(B)\,A}{B^2}+\frac{G\,L^{\#}(B)\,A}{B^3}+\frac{4\,L(B)\,L^{\#}(B)\,A}{B^4}-\frac{A\,F}{B}=0$$

$$\frac{K\,L(B)\,A}{B^2}-\frac{K\,L(A)}{B}+\frac{K\,L^{\#}(B)\,A}{B^3}-\frac{K\,L^{\#}(A)}{B^2}+\frac{K\,A^2}{B^2}+\frac{2\,L(B)\,L^{\#}(B)\,A}{B^3}$$

$$-\frac{L^{\#}(L(B))\,A}{B^2}-\frac{L(B)\,L^{\#}(A)}{B^2}-\frac{L^{\#}(B)\,L(A)}{B^2}+\frac{L^{\#}(L(A))}{B}+\frac{3\,L^{\#}(B)^2\,A}{B^4}$$

$$-\frac{L^{\#}\left(L^{\#}(B)\right)A}{B^3}-\frac{3\,L^{\#}(B)\,L^{\#}(A)}{B^3}+\frac{L^{\#}\left(L^{\#}(A)\right)}{B^2}+\frac{2\,L^{\#}(B)\,A^2}{B^3}-\frac{2\,A\,L^{\#}(A)}{B^2}-\frac{A\,J}{B}$$

$$+H-\frac{E^{\#}}{B^2}=0$$

$$\frac{Nr\,L(B)\,A}{B^2}-\frac{Nr\,L(A)}{B}+\frac{Nr\,L^{\#}(B)\,A}{B^3}-\frac{Nr\,L^{\#}(A)}{B^2}+\frac{Nr\,A^2}{B^2}-\frac{A\,Mr}{B}-\frac{\mathrm{I}\,L\left(L^{\#}(B)\right)A}{B^2}$$

$$+\frac{\mathrm{I}\,L\left(L^{\#}(A)\right)}{B}+\frac{\mathrm{I}\,L^{\#}(L(B))\,A}{B^2}-\frac{\mathrm{I}\,L^{\#}(L(A))}{B}+Lr-\frac{Lr^{\#}}{B}=0$$

$$0=0$$
$$0=0$$
$$0=0$$
$$0=0$$
$$0=0$$

(15)

M > **for** j **from** 1 **to** 3 **do for** i **from** 1 **to** 10 **do** $Equation[j,i] := expand(Res1[j][i] - Res2[j][i])$: **od od**;

M > $Equations(1)$;

$$\frac{Tr}{B^2}+\frac{2\,S(B)}{B^3}-\frac{Nr^{\#}\,L(A)}{B^2}-\frac{Nr^{\#}\,L^{\#}(A)}{B^3}-\frac{Nr^{\#}\,A^2}{B^3}+\frac{Qr^{\#}\,A}{B^3}-\frac{Tr^{\#}}{B^3}=0$$

$$\frac{Qr}{B^2}+\frac{2\,\mathrm{I}\,L\left(L^{\#}(B)\right)}{B^3}-\frac{2\,\mathrm{I}\,L^{\#}(L(B))}{B^3}+\frac{Nr^{\#}\,L(B)}{B^2}+\frac{Nr^{\#}\,L^{\#}(B)}{B^3}+\frac{2\,Nr^{\#}\,A}{B^2}-\frac{Qr^{\#}}{B^2}=0$$

$$\frac{G}{B^2}+\frac{3\,L(B)}{B^3}+\frac{L^{\#}(B)}{B^4}+\frac{2\,A}{B^3}-\frac{K^{\#}}{B^2}=0$$

$$\frac{K}{B^2}+\frac{3\,L^{\#}(B)}{B^3}+\frac{L(B)}{B^2}+\frac{2\,A}{B^2}-\frac{G^{\#}}{B^2}=0$$

$$\frac{Nr}{B^2}-\frac{Nr^{\#}}{B}=0$$

$$0=0$$
$$0=0$$
$$0=0$$
$$0=0$$
$$0=0$$

(16)

M > $Nr^{\#} := solve\left(Equation[1,5], Nr^{\#}\right)$;

$$Nr^{\#} := \frac{Nr}{B}$$

(17)

M > $conjugue\left(\frac{Nr}{B}\right)$;

$$Nr$$

(18)

M > $K^{\#} := solve\left(Equation[1,3], K^{\#}\right)$;

$$K^{\#} := \frac{G\,B^2+3\,B\,L(B)+L^{\#}(B)+2\,A\,B}{B^2}$$

(19)

M > $G^{\#} := solve\left(Equation[1,4], G^{\#}\right)$;

(20)

$$G^{\#} := \frac{K\,B + 3\,L^{\#}(B) + B\,L(B) + 2\,A\,B}{B} \tag{20}$$

```
> Qr# := expand(solve(Equation[1, 2], Qr#));
```

$$Qr^{\#} := Qr + \frac{2\,\mathrm{I}\,L(L^{\#}(B))}{B} - \frac{2\,\mathrm{I}\,L^{\#}(L(B))}{B} + \frac{Nr\,L(B)}{B} + \frac{Nr\,L^{\#}(B)}{B^2} + \frac{2\,Nr\,A}{B} \tag{21}$$

```
> Tr# := expand(solve(Equation[1, 1], Tr#));
```

$$Tr^{\#} := Tr\,B + 2\,S(B) - Nr\,L(A) - \frac{Nr\,L^{\#}(A)}{B} + \frac{Nr\,A^2}{B} + Qr\,A + \frac{2\,\mathrm{I}\,L(L^{\#}(B))\,A}{B} - \frac{2\,\mathrm{I}\,L^{\#}(L(B))\,A}{B} + \frac{Nr\,L(B)\,A}{B} + \frac{Nr\,L^{\#}(B)\,A}{B^2} \tag{22}$$

```
> Equations(2);
```

$$-\frac{Tr\,L(B)}{B^2} - \frac{Tr\,L^{\#}(B)}{B^3} - \frac{2\,Tr\,A}{B^2} - \frac{2\,S(B)\,L(B)}{B^3} + \frac{S(L(B))}{B^2} - \frac{3\,S(B)\,L^{\#}(B)}{B^4} + \frac{S(L^{\#}(B))}{B^3} - \frac{4\,S(B)\,A}{B^3} + \frac{2\,S(A)}{B^2} + \frac{Sr}{B} - \frac{R(B)}{B^2} - \frac{Mr^{\#}\,L(A)}{B^2} - \frac{Mr^{\#}\,L^{\#}(A)}{B^3} - \frac{Mr^{\#}\,A^2}{B^3} + \frac{Pr^{\#}\,A}{B^3} - \frac{Sr^{\#}}{B^3} = 0$$

$$-\frac{Qr\,L(B)}{B^2} - \frac{Qr\,L^{\#}(B)}{B^3} - \frac{2\,Qr\,A}{B^2} - \frac{2\,\mathrm{I}\,L(B)\,L(L^{\#}(B))}{B^3} - \frac{4\,\mathrm{I}\,L(L^{\#}(B))\,A}{B^3} - \frac{\mathrm{I}\,L^{\#}(L(L^{\#}(B)))}{B^3} - \frac{2\,\mathrm{I}\,L^{\#}(L(A))}{B^2} + \frac{\mathrm{I}\,L(L^{\#}(L(B)))}{B^2} + \frac{\mathrm{I}\,L(L^{\#}(L^{\#}(B)))}{B^3} + \frac{3\,\mathrm{I}\,L^{\#}(L(B))\,L^{\#}(B)}{B^4} + \frac{2\,\mathrm{I}\,L(B)\,L^{\#}(L(B))}{B^3} - \frac{3\,\mathrm{I}\,L^{\#}(B)\,L(L^{\#}(B))}{B^4} + \frac{2\,\mathrm{I}\,L(L^{\#}(A))}{B^2} - \frac{\mathrm{I}\,L^{\#}(L(L(B)))}{B^2} + \frac{4\,\mathrm{I}\,L^{\#}(L(B))\,A}{B^3} + \frac{Pr}{B} + \frac{Mr^{\#}\,L(B)}{B^2} + \frac{Mr^{\#}\,L^{\#}(B)}{B^3} + \frac{2\,Mr^{\#}\,A}{B^2} - \frac{Pr^{\#}}{B^2} = 0$$

$$-\frac{G\,L(B)}{B^2} - \frac{G\,L^{\#}(B)}{B^3} - \frac{2\,G\,A}{B^2} - \frac{2\,L(B)^2}{B^3} + \frac{L(L(B))}{B^2} - \frac{4\,L(B)\,L^{\#}(B)}{B^4} + \frac{L(L^{\#}(B))}{B^3} - \frac{6\,L(B)\,A}{B^3} + \frac{3\,L(A)}{B^2} + \frac{F}{B} - \frac{4\,L^{\#}(B)\,A}{B^4} + \frac{L^{\#}(A)}{B^3} - \frac{3\,A^2}{B^3} - \frac{L^{\#}(B)^2}{B^5} - \frac{J^{\#}}{B^2} = 0$$

$$-\frac{K\,L(B)}{B^2} - \frac{K\,L^{\#}(B)}{B^3} - \frac{2\,K\,A}{B^2} - \frac{2\,L(B)\,L^{\#}(B)}{B^3} + \frac{L^{\#}(L(B))}{B^2} - \frac{3\,L^{\#}(B)^2}{B^4} + \frac{L^{\#}(L^{\#}(B))}{B^3} - \frac{5\,L^{\#}(B)\,A}{B^3} + \frac{3\,L^{\#}(A)}{B^2} + \frac{J}{B} - \frac{L(B)\,A}{B^2} + \frac{L(A)}{B} - \frac{A^2}{B^2} - \frac{F^{\#}}{B^2} = 0$$

$$-\frac{Nr\,L(B)}{B^2} - \frac{Nr\,L^{\#}(B)}{B^3} - \frac{2\,Nr\,A}{B^2} + \frac{Mr}{B} + \frac{\mathrm{I}\,L(L^{\#}(B))}{B^2} - \frac{\mathrm{I}\,L^{\#}(L(B))}{B^2} - \frac{Mr^{\#}}{B} = 0$$

$$0 = 0$$
$$0 = 0$$
$$0 = 0$$
$$0 = 0$$
$$0 = 0 \tag{23}$$

> $Mr^{\#} := expand(solve(Equation[2, 5], Mr^{\#}))$;

$$Mr^{\#} := -\frac{Nr\,L(B)}{B} - \frac{Nr\,L^{\#}(B)}{B^2} - \frac{2\,Nr\,A}{B} + Mr + \frac{I\,L(L^{\#}(B))}{B} - \frac{I\,L^{\#}(L(B))}{B} \tag{24}$$

> $F^{\#} := expand(solve(Equation[2, 4], F^{\#}))$;

$$F^{\#} := -K\,L(B) - \frac{K\,L^{\#}(B)}{B} - 2\,K\,A - \frac{2\,L(B)\,L^{\#}(B)}{B} + L^{\#}(L(B)) - \frac{3\,L^{\#}(B)^2}{B^2} \tag{25}$$
$$+ \frac{L^{\#}(L^{\#}(B))}{B} - \frac{5\,L^{\#}(B)\,A}{B} + 3\,L^{\#}(A) + B\,J - L(B)\,A + B\,L(A) - A^2$$

> $J^{\#} := expand(solve(Equation[2, 3], J^{\#}))$;

$$J^{\#} := -G\,L(B) - \frac{G\,L^{\#}(B)}{B} - 2\,G\,A - \frac{2\,L(B)^2}{B} + L(L(B)) - \frac{4\,L(B)\,L^{\#}(B)}{B^2} + \frac{L(L^{\#}(B))}{B} \tag{26}$$
$$- \frac{6\,A\,L(B)}{B} + 3\,L(A) + B\,F - \frac{4\,L^{\#}(B)\,A}{B^2} + \frac{L^{\#}(A)}{B} - \frac{3\,A^2}{B} - \frac{L^{\#}(B)^2}{B^3}$$

> $Pr^{\#} := expand(solve(Equation[2, 2], Pr^{\#}))$;

$$Pr^{\#} := -\frac{2\,L(B)\,Nr\,L^{\#}(B)}{B^2} - \frac{I\,L(B)\,L(L^{\#}(B))}{B} + \frac{2\,I\,L^{\#}(L(B))\,L^{\#}(B)}{B^2} + \frac{I\,L(B)\,L^{\#}(L(B))}{B} \tag{27}$$
$$- \frac{2\,I\,L^{\#}(B)\,L(L^{\#}(B))}{B^2} - \frac{2\,I\,L(L^{\#}(B))\,A}{B} + \frac{2\,I\,L^{\#}(L(B))\,A}{B} - \frac{4\,Nr\,A^2}{B} - 2\,Qr\,A$$
$$+ B\,Pr - \frac{4\,Nr\,L(B)\,A}{B} - \frac{4\,Nr\,L^{\#}(B)\,A}{B^2} - I\,L^{\#}(L(L(B))) - 2\,I\,L^{\#}(L(A))$$
$$+ I\,L(L^{\#}(L(B))) + 2\,I\,L(L^{\#}(A)) + 2\,A\,Mr - Qr\,L(B) - \frac{Qr\,L^{\#}(B)}{B} - \frac{L(B)^2\,Nr}{B}$$
$$+ L(B)\,Mr + \frac{L^{\#}(B)\,Mr}{B} - \frac{Nr\,L^{\#}(B)^2}{B^3} - \frac{I\,L^{\#}(L(L^{\#}(B)))}{B} + \frac{I\,L(L^{\#}(L^{\#}(B)))}{B}$$

> $Sr^{\#} := expand(solve(Equation[2, 1], Sr^{\#}))$;

$$Sr^{\#} := -4\,S(B)\,A + S(L^{\#}(B)) - 2\,B\,Tr\,A - \frac{2\,A^3\,Nr}{B} + A^2\,Mr - 2\,Qr\,A^2 + B\,A\,Pr - B\,Tr\,L(B) \tag{28}$$
$$- Tr\,L^{\#}(B) - 2\,S(B)\,L(B) - \frac{3\,S(B)\,L^{\#}(B)}{B} - B\,L(A)\,Mr - L^{\#}(A)\,Mr$$
$$- I\,L(A)\,L(L^{\#}(B)) - I\,A\,L^{\#}(L(L(B))) + L(A)\,Nr\,L(B) + \frac{L(A)\,Nr\,L^{\#}(B)}{B} + 2\,L(A)\,Nr\,A$$
$$+ \frac{L^{\#}(A)\,Nr\,L(B)}{B} + \frac{L^{\#}(A)\,Nr\,L^{\#}(B)}{B^2} + \frac{2\,L^{\#}(A)\,Nr\,A}{B} - \frac{3\,A^2\,Nr\,L(B)}{B}$$

$$-\frac{3A^2 Nr L^{\#}(B)}{B^2} - A\,Qr\,L(B) - \frac{A\,Qr\,L^{\#}(B)}{B} - \frac{A\,L(B)^2 Nr}{B} + A\,L(B)\,Mr$$

$$+\frac{A\,L^{\#}(B)\,Mr}{B} - \frac{A\,Nr\,L^{\#}(B)^2}{B^3} - \frac{I\,L^{\#}(A)\,L(L^{\#}(B))}{B} - \frac{I\,A\,L^{\#}(L(L^{\#}(B)))}{B}$$

$$+\frac{I\,L^{\#}(A)\,L^{\#}(L(B))}{B} - \frac{3\,I\,A^2\,L(L^{\#}(B))}{B} + \frac{3\,I\,A^2\,L^{\#}(L(B))}{B} + \frac{I\,A\,L(L^{\#}(L^{\#}(B)))}{B}$$

$$+2\,S(A)\,B - \frac{2\,A\,L(B)\,Nr\,L^{\#}(B)}{B^2} - \frac{I\,A\,L(B)\,L(L^{\#}(B))}{B} + \frac{2\,I\,A\,L^{\#}(L(B))\,L^{\#}(B)}{B^2}$$

$$+\frac{I\,A\,L(B)\,L^{\#}(L(B))}{B} - \frac{2\,I\,A\,L^{\#}(B)\,L(L^{\#}(B))}{B^2} + B\,S(L(B)) - B\,R(B) + B^2\,Sr$$

$$+I\,L(A)\,L^{\#}(L(B)) - 2\,I\,A\,L^{\#}(L(A)) + I\,A\,L(L^{\#}(L(B))) + 2\,I\,A\,L(L^{\#}(A))$$

M > *Equations*(3);

$$-\frac{Lr^{\#}\,L(A)}{B^2} + \frac{OR^{\#}\,A}{B^3} + Rr + \frac{R(B)\,A}{B^2} - \frac{R(A)}{B} - \frac{Rr^{\#}}{B^3} + \frac{S(L(A))}{B} + \frac{S(L^{\#}(A))}{B^2}$$

$$-\frac{2\,S(B)\,L^{\#}(A)}{B^3} + \frac{2\,S(B)\,A^2}{B^3} - \frac{S(B)\,L(A)}{B^2} - \frac{2\,A\,S(A)}{B^2} - \frac{Lr^{\#}\,A^2}{B^3} - \frac{L^{\#}(B)\,S(A)}{B^3}$$

$$-\frac{S(L(B))\,A}{B^2} - \frac{Tr\,L^{\#}(A)}{B^2} - \frac{S(L^{\#}(B))\,A}{B^3} - \frac{Lr^{\#}\,L^{\#}(A)}{B^3} + \frac{Tr\,A^2}{B^2} - \frac{L(B)\,S(A)}{B^2}$$

$$-\frac{Tr\,L(A)}{B} + \frac{Tr\,L(B)\,A}{B^2} + \frac{Tr\,L^{\#}(B)\,A}{B^3} + \frac{2\,S(B)\,L(B)\,A}{B^3} + \frac{3\,S(B)\,L^{\#}(B)\,A}{B^4}$$

$$-\frac{A\,Sr}{B} = 0$$

$$OR + \frac{2\,I\,L(B)\,L(L^{\#}(B))\,A}{B^3} - \frac{2\,I\,L(B)\,L^{\#}(L(B))\,A}{B^3} + \frac{3\,I\,L^{\#}(B)\,L(L^{\#}(B))\,A}{B^4}$$

$$-\frac{3\,I\,L^{\#}(L(B))\,L^{\#}(B)\,A}{B^4} - \frac{Qr\,L^{\#}(A)}{B^2} - \frac{OR^{\#}}{B^2} - \frac{Qr\,L(A)}{B} + \frac{2\,Lr^{\#}\,A}{B^2}$$

$$+\frac{I\,L(L^{\#}(L(A)))}{B} + \frac{Lr^{\#}\,L^{\#}(B)}{B^3} + \frac{Lr^{\#}\,L(B)}{B^2} + \frac{Qr\,A^2}{B^2} - \frac{I\,L^{\#}(L(L^{\#}(A)))}{B^2}$$

$$+\frac{I\,L(L^{\#}(L^{\#}(A)))}{B^2} - \frac{I\,L^{\#}(L(L(A)))}{B} + \frac{Qr\,L(B)\,A}{B^2} + \frac{Qr\,L^{\#}(B)\,A}{B^3}$$

$$+\frac{I\,L^{\#}(L(L(B)))\,A}{B^2} + \frac{I\,L^{\#}(L(L^{\#}(B)))\,A}{B^3} + \frac{I\,L^{\#}(L(B))\,L(A)}{B^2} + \frac{I\,L(B)\,L^{\#}(L(A))}{B^2}$$

$$+\frac{I\,L^{\#}(B)\,L^{\#}(L(A))}{B^3} - \frac{I\,L(L^{\#}(B))\,L(A)}{B^2} - \frac{I\,L(L^{\#}(L(B)))\,A}{B^2} + \frac{2\,I\,L(L^{\#}(B))\,A^2}{B^3}$$

$$-\frac{I\,L(B)\,L(L^{\#}(A))}{B^2} - \frac{I\,L(L^{\#}(L^{\#}(B)))\,A}{B^3} - \frac{2\,I\,L(L^{\#}(B))\,L^{\#}(A)}{B^3}$$

$$-\frac{I L^{\#}(B)\, L(L^{\#}(A))}{B^3} - \frac{2\, I A\, L(L^{\#}(A))}{B^2} + \frac{2\, I L^{\#}(L(B))\, L^{\#}(A)}{B^3} - \frac{2\, I L^{\#}(L(B))\, A^2}{B^3}$$
$$+\frac{2\, I A\, L^{\#}(L(A))}{B^2} - \frac{A\, Pr}{B} = 0$$

$$E - \frac{H^{\#}}{B^2} + \frac{A^3}{B^3} + \frac{L(L(A))}{B} + \frac{L(L^{\#}(A))}{B^2} - \frac{L(L^{\#}(B))\, A}{B^3} - \frac{L^{\#}(B)\, L(A)}{B^3} + \frac{2\, L(B)^2\, A}{B^3}$$
$$+\frac{L^{\#}(B)^2\, A}{B^5} - \frac{2\, L(B)\, L(A)}{B^2} + \frac{3\, L^{\#}(B)\, A^2}{B^4} + \frac{G A^2}{B^2} - \frac{L(L(B))\, A}{B^2} - \frac{3\, A\, L(A)}{B^2}$$
$$-\frac{G L(A)}{B} - \frac{3\, L(B)\, L^{\#}(A)}{B^3} - \frac{L^{\#}(B)\, L^{\#}(A)}{B^4} - \frac{3\, A\, L^{\#}(A)}{B^3} + \frac{3\, L(B)\, A^2}{B^3} - \frac{G L^{\#}(A)}{B^2}$$
$$+\frac{G L(B)\, A}{B^2} + \frac{G L^{\#}(B)\, A}{B^3} + \frac{4\, L(B)\, L^{\#}(B)\, A}{B^4} - \frac{A F}{B} = 0$$

$$\frac{K L(B)\, A}{B^2} - \frac{K L(A)}{B} + \frac{K L^{\#}(B)\, A}{B^3} - \frac{K L^{\#}(A)}{B^2} + \frac{K A^2}{B^2} + \frac{2\, L(B)\, L^{\#}(B)\, A}{B^3}$$
$$-\frac{L^{\#}(L(B))\, A}{B^2} - \frac{L(B)\, L^{\#}(A)}{B^2} - \frac{L^{\#}(B)\, L(A)}{B^2} + \frac{L^{\#}(L(A))}{B} + \frac{3\, L^{\#}(B)^2\, A}{B^4}$$
$$-\frac{L^{\#}(L^{\#}(B))\, A}{B^3} - \frac{3\, L^{\#}(B)\, L^{\#}(A)}{B^3} + \frac{L^{\#}(L^{\#}(A))}{B^2} + \frac{2\, L^{\#}(B)\, A^2}{B^3} - \frac{2\, A\, L^{\#}(A)}{B^2} - \frac{A J}{B}$$
$$+H - \frac{E^{\#}}{B^2} = 0$$

$$\frac{Nr\, L(B)\, A}{B^2} - \frac{Nr\, L(A)}{B} + \frac{Nr\, L^{\#}(B)\, A}{B^3} - \frac{Nr\, L^{\#}(A)}{B^2} + \frac{Nr\, A^2}{B^2} - \frac{A\, Mr}{B} - \frac{I L(L^{\#}(B))\, A}{B^2}$$
$$+\frac{I L(L^{\#}(A))}{B} + \frac{I L^{\#}(L(B))\, A}{B^2} - \frac{I L^{\#}(L(A))}{B} + Lr - \frac{Lr^{\#}}{B} = 0$$

$$0 = 0$$
$$0 = 0$$
$$0 = 0$$
$$0 = 0$$
$$0 = 0$$

(29)

```
> Lr# := expand(solve(Equation[3, 5], Lr#));
```

$$Lr^{\#} := \frac{Nr\, L(B)\, A}{B} - Nr\, L(A) + \frac{Nr\, L^{\#}(B)\, A}{B^2} - \frac{Nr\, L^{\#}(A)}{B} + \frac{Nr\, A^2}{B} - A\, Mr - \frac{I L(L^{\#}(B))\, A}{B}$$
$$+I L(L^{\#}(A)) + \frac{I L^{\#}(L(B))\, A}{B} - I L^{\#}(L(A)) + B\, Lr$$

(30)

```
> E# := expand(solve(Equation[3, 4], E#));
```

$$E^{\#} := K L(B)\, A - B K L(A) + \frac{K L^{\#}(B)\, A}{B} - K L^{\#}(A) + K A^2 + \frac{2\, L(B)\, L^{\#}(B)\, A}{B}$$

(31)

$$-L^{\#}(L(B))\,A - L(B)\,L^{\#}(A) - L^{\#}(B)\,L(A) + L^{\#}(L(A))\,B + \frac{3\,L^{\#}(B)^2\,A}{B^2}$$
$$-\frac{L^{\#}(L^{\#}(B))\,A}{B} - \frac{3\,L^{\#}(B)\,L^{\#}(A)}{B} + L^{\#}(L^{\#}(A)) + \frac{2\,L^{\#}(B)\,A^2}{B} - 2\,A\,L^{\#}(A) - B\,A\,J$$
$$+B^2\,H$$

> $H^{\#} := expand(solve(Equation[3,3], H^{\#}));$

$$H^{\#} := B^2\,E - B\,G\,L(A) + \frac{A^3}{B} + B\,L(L(A)) + L(L^{\#}(A)) - \frac{L(L^{\#}(B))\,A}{B} - \frac{L^{\#}(B)\,L(A)}{B} \quad (32)$$
$$+\frac{2\,L(B)^2\,A}{B} + \frac{L^{\#}(B)^2\,A}{B^3} - 2\,L(B)\,L(A) + \frac{3\,L^{\#}(B)\,A^2}{B^2} + G\,A^2 - L(L(B))\,A$$
$$-3\,A\,L(A) + \frac{3\,A^2\,L(B)}{B} - \frac{3\,L(B)\,L^{\#}(A)}{B} - \frac{L^{\#}(B)\,L^{\#}(A)}{B^2} - \frac{3\,A\,L^{\#}(A)}{B}$$
$$+\frac{4\,L(B)\,L^{\#}(B)\,A}{B^2} - G\,L^{\#}(A) + G\,L(B)\,A + \frac{G\,L^{\#}(B)\,A}{B} - B\,A\,F$$

> $OR^{\#} := expand(solve(Equation[3,2], OR^{\#}));$

$$OR^{\#} := L^{\#}(B)\,Lr + B\,L(B)\,Lr + \mathrm{I}\,B\,L(L^{\#}(L(A))) - B\,Qr\,L(A) + \mathrm{I}\,L(L^{\#}(L^{\#}(A))) - Qr\,L^{\#}(A) \quad (33)$$
$$-\mathrm{I}\,B\,L^{\#}(L(L(A))) - \mathrm{I}\,L^{\#}(L(L^{\#}(A))) - \frac{2\,\mathrm{I}\,L^{\#}(A)\,L(L^{\#}(B))}{B} + \frac{2\,\mathrm{I}\,L^{\#}(A)\,L^{\#}(L(B))}{B}$$
$$+2\,B\,A\,Lr + \frac{2\,A^3\,Nr}{B} - 2\,A^2\,Mr + Qr\,A^2 - B\,A\,Pr - \mathrm{I}\,L(A)\,L(L^{\#}(B)) - L(A)\,Nr\,L(B)$$
$$-\frac{L(A)\,Nr\,L^{\#}(B)}{B} - 2\,L(A)\,Nr\,A - \frac{L^{\#}(A)\,Nr\,L(B)}{B} - \frac{L^{\#}(A)\,Nr\,L^{\#}(B)}{B^2}$$
$$-\frac{2\,L^{\#}(A)\,Nr\,A}{B} + \frac{3\,A^2\,Nr\,L(B)}{B} + \frac{3\,A^2\,Nr\,L^{\#}(B)}{B^2} + A\,Qr\,L(B) + \frac{A\,Qr\,L^{\#}(B)}{B}$$
$$+\frac{\mathrm{I}\,A\,L^{\#}(L(L^{\#}(B)))}{B} + \mathrm{I}\,A\,L^{\#}(L(L(B))) + \frac{A\,L(B)^2\,Nr}{B} - A\,L(B)\,Mr - \frac{A\,L^{\#}(B)\,Mr}{B}$$
$$-\mathrm{I}\,A\,L(L^{\#}(L(B))) - \frac{\mathrm{I}\,A\,L(L^{\#}(L^{\#}(B)))}{B} + \frac{A\,Nr\,L^{\#}(B)^2}{B^3} + B^2\,OR$$
$$+\frac{2\,A\,L(B)\,Nr\,L^{\#}(B)}{B^2} + \frac{\mathrm{I}\,A\,L(B)\,L(L^{\#}(B))}{B} - \frac{2\,\mathrm{I}\,A\,L^{\#}(L(B))\,L^{\#}(B)}{B^2}$$
$$-\frac{\mathrm{I}\,A\,L(B)\,L^{\#}(L(B))}{B} + \frac{2\,\mathrm{I}\,A\,L^{\#}(B)\,L(L^{\#}(B))}{B^2} + \mathrm{I}\,L(A)\,L^{\#}(L(B))$$

> $Rr^{\#} := expand(solve(Equation[3,1], Rr^{\#}));$

$$Rr^{\#} := B\,Tr\,A^2 - \frac{2\,L^{\#}(A)\,Nr\,L(B)\,A}{B} - \frac{2\,L^{\#}(A)\,Nr\,L^{\#}(B)\,A}{B^2} + \frac{\mathrm{I}\,L^{\#}(A)\,L^{\#}(L(B))\,A}{B} \quad (34)$$
$$-2\,L(A)\,Nr\,L(B)\,A - \frac{2\,L(A)\,Nr\,L^{\#}(B)\,A}{B} + \frac{2\,A^2\,L(B)\,Nr\,L^{\#}(B)}{B^2}$$

$$+\frac{I A^2 L(B)\, L(L^{\#}(B))}{B} - \frac{I L^{\#}(A)\, L(L^{\#}(B))\, A}{B} - \frac{2\, I A^2 L^{\#}(L(B))\, L^{\#}(B)}{B^2}$$

$$-\frac{I A^2 L(B)\, L^{\#}(L(B))}{B} + \frac{2\, I A^2 L^{\#}(B)\, L(L^{\#}(B))}{B^2} + B\, Tr\, L(B)\, A + Tr\, L^{\#}(B)\, A$$

$$+2\, S(B)\, L(B)\, A + \frac{3\, S(B)\, L^{\#}(B)\, A}{B} + 2\, L^{\#}(A)\, Nr\, L(A) - \frac{2\, L^{\#}(A)\, Nr\, A^2}{B} + L^{\#}(A)\, A\, Mr$$

$$+I L^{\#}(A)\, L^{\#}(L(A)) - 2\, L(A)\, Nr\, A^2 + B\, L(A)\, A\, Mr + I B\, L(A)\, L^{\#}(L(A))$$

$$+\frac{2\, A^3\, Nr\, L(B)}{B} + \frac{2\, A^3\, Nr\, L^{\#}(B)}{B^2} + \frac{I A^3 L(L^{\#}(B))}{B} + I A^2 L^{\#}(L(A)) + A\, L^{\#}(B)\, Lr$$

$$+B\, A\, L(B)\, Lr + A^2\, Qr\, L(B) + \frac{A^2\, Qr\, L^{\#}(B)}{B} + \frac{I A^2 L^{\#}(L(L^{\#}(B)))}{B} + I A^2 L^{\#}(L(L(B)))$$

$$+\frac{A^2\, L(B)^2\, Nr}{B} - A^2\, L(B)\, Mr - \frac{A^2\, L^{\#}(B)\, Mr}{B} + I B\, A\, L(L^{\#}(L(A))) - B\, A\, Qr\, L(A)$$

$$+I A\, L(L^{\#}(L^{\#}(A))) - A\, Qr\, L^{\#}(A) - I L^{\#}(A)\, L(L^{\#}(A)) - I B\, L(A)\, L(L^{\#}(A))$$

$$-I A^2 L(L^{\#}(A)) - \frac{I A^3 L^{\#}(L(B))}{B} - I A^2 L(L^{\#}(L(B))) - \frac{I A^2 L(L^{\#}(L^{\#}(B)))}{B}$$

$$-I B\, A\, L^{\#}(L(L(A))) - I A\, L^{\#}(L(L^{\#}(A))) + \frac{A^2\, Nr\, L^{\#}(B)^2}{B^3} - A^3\, Mr + B\, A^2\, Lr + Qr\, A^3$$

$$-B\, A^2\, Pr + B^2\, A\, OR - 2\, B\, A\, S(A) + 2\, S(B)\, A^2 - B^2\, Tr\, L(A) - B\, S(B)\, L(A)$$

$$-B\, S(L(B))\, A - S(L^{\#}(B))\, A + B\, R(B)\, A - B\, Tr\, L^{\#}(A) - 2\, S(B)\, L^{\#}(A) - L^{\#}(B)\, S(A)$$

$$+\frac{L^{\#}(A)^2\, Nr}{B} - B\, L^{\#}(A)\, Lr + B\, L(A)^2\, Nr - B^2\, L(A)\, Lr - B\, L(B)\, S(A) + \frac{A^4\, Nr}{B} + B^3\, Rr$$

$$+B^2\, S(L(A)) + B\, S(L^{\#}(A)) - B^2\, R(A) - B^2\, A\, Sr$$

> $F0 := expand\left(\frac{1}{a^3}\cdot\left(\frac{1}{10}\,\frac{a^3\cdot L(B)}{\sqrt{B}} + \frac{3}{10}\,a^3\sqrt{B}\,G + \frac{1}{10}\,\frac{a^3\,L^{\#}(B)}{B^{3/2}} - \frac{2}{5}\,\frac{a^3\,A}{\sqrt{B}} + \frac{3}{10}\,\frac{a^3\,K}{\sqrt{B}}\right)\right);$

$$F0 := \frac{1}{10}\,\frac{L(B)}{\sqrt{B}} + \frac{3}{10}\,\sqrt{B}\,G + \frac{1}{10}\,\frac{L^{\#}(B)}{B^{3/2}} - \frac{2}{5}\,\frac{A}{\sqrt{B}} + \frac{3}{10}\,\frac{K}{\sqrt{B}} \tag{35}$$

> $expand\left(conjugue(F0) - F0 + B^{\frac{3}{2}}\cdot exp2\right);$

$$0 \tag{36}$$

> $C0 := expand\left(\frac{1}{a^2}\cdot\left(\frac{11}{20}\,\frac{a^2\,L(B)}{\sqrt{B}} + \frac{3}{20}\,a^2\sqrt{B}\,G + \frac{1}{20}\,\frac{a^2\,L^{\#}(B)}{B^{3/2}} - \frac{1}{5}\,\frac{A\,a^2}{\sqrt{B}} + \frac{3}{20}\,\frac{a^2\,K}{\sqrt{B}}\right)\right);$

$$C0 := \frac{11}{20}\,\frac{L(B)}{\sqrt{B}} + \frac{3}{20}\,\sqrt{B}\,G + \frac{1}{20}\,\frac{L^{\#}(B)}{B^{3/2}} - \frac{1}{5}\,\frac{A}{\sqrt{B}} + \frac{3}{20}\,\frac{K}{\sqrt{B}} \tag{37}$$

```
> expand(A#·B^(1/2) + (conjugue(C0)) - C0);
```

$$0 \tag{38}$$

```
> coeff1 := expand( (1/a^2)·( (1/2) a^2 F0 L(B)/sqrt(B) - F0^2 a^2 + sqrt(B) F0 a^2 G - sqrt(B) L(F0) a^2
      + C0 F0 a^2 + F B a^2 ) ) :
```

```
> expand(conjugue(C0)·exp2·B^(3/2) + B·exp3 + conjugue(G0) - G0);
```

$$0 \tag{39}$$

```
> coeff2 := expand( (1/a^2)·( (1/2) a^2 L#(B) F0/B^(3/2) - F0^2 a^2 + a^2 F0 K/sqrt(B) - a^2 L#(F0)/sqrt(B) + a^2 J
      + C0 F0 a^2 - a^2 F0 L(B)/sqrt(B) - a^2 A F0/sqrt(B) ) ) :
```

```
> G0 := (coeff1 + coeff2)/2;
```

$$G0 := \frac{1}{2} J + \frac{21}{100} G K + \frac{17}{100} \frac{L(B) K}{B} - \frac{23}{100} \frac{A K}{B} + \frac{17}{100} \frac{L^{\#}(B) K}{B^2} - \frac{3}{20} B L(G) \tag{40}$$
$$- \frac{3}{20} L^{\#}(G) + \frac{1}{5} L(A) + \frac{1}{5} \frac{L^{\#}(A)}{B} - \frac{23}{100} G A + \frac{1}{50} G L(B) + \frac{1}{50} \frac{G L^{\#}(B)}{B}$$
$$+ \frac{7}{50} \frac{L(B) L^{\#}(B)}{B^2} - \frac{21}{100} \frac{A L(B)}{B} - \frac{21}{100} \frac{L^{\#}(B) A}{B^2} - \frac{1}{20} L(L(B)) - \frac{3}{20} L(K)$$
$$- \frac{1}{20} \frac{L(L^{\#}(B))}{B} - \frac{3}{20} \frac{L^{\#}(K)}{B} - \frac{1}{20} \frac{L^{\#}(L(B))}{B} - \frac{1}{20} \frac{L^{\#}(L^{\#}(B))}{B^2} + \frac{9}{200} \frac{L(B)^2}{B}$$
$$+ \frac{1}{2} B F + \frac{3}{25} \frac{A^2}{B} + \frac{19}{200} \frac{L^{\#}(B)^2}{B^3} + \frac{21}{200} B G^2 + \frac{21}{200} \frac{K^2}{B}$$

```
> expand( -(1/4) F0 L(B)/(a^2 sqrt(B)) - F0^2/a^2 + (1/2) sqrt(B) F0 G/a^2 - (1/2) sqrt(B) L(F0)/a^2 + C0 F0/a^2
      + (1/2) B F/a^2 + (1/4) L#(B) F0/(a^2 B^(3/2)) + (1/2) F0 K/(a^2 sqrt(B)) - (1/2) L#(F0)/(a^2 sqrt(B)) + (1/2) J/a^2 - (1/2) A F0/(a^2 sqrt(B))
      + (1/2) C0 L(B)/(a^2 sqrt(B)) - C0^2/a^2 - sqrt(B) L(C0)/a^2 - I B1 A/(a^2 sqrt(B)) + I D1/a^2 - I B1 C0/a^2 );
```

$$\frac{1}{2} \frac{J}{a^2} - \frac{\frac{11}{20} I B1 L(B)}{a^2 \sqrt{B}} - \frac{\frac{3}{20} I B1 \sqrt{B} G}{a^2} - \frac{\frac{1}{20} I B1 L^{\#}(B)}{a^2 B^{3/2}} - \frac{\frac{3}{20} I B1 K}{a^2 \sqrt{B}} \tag{41}$$
$$- \frac{\frac{4}{5} I B1 A}{a^2 \sqrt{B}} - \frac{29}{200} \frac{L(B) G}{a^2} + \frac{37}{200} \frac{L(B) L^{\#}(B)}{a^2 B^2} - \frac{19}{100} \frac{L(B) A}{a^2 B} + \frac{31}{200} \frac{L(B) K}{a^2 B}$$

$$-\frac{17}{100}\frac{AK}{a^2B}+\frac{31}{200}\frac{L^{\#}(B)K}{a^2B^2}+\frac{1}{200}\frac{GL^{\#}(B)}{a^2B}-\frac{19}{100}\frac{L^{\#}(B)A}{a^2B^2}+\frac{117}{400}\frac{L(B)^2}{a^2B}$$
$$+\frac{33}{200}\frac{GK}{a^2}-\frac{17}{100}\frac{GA}{a^2}+\frac{2}{25}\frac{A^2}{a^2B}+\frac{37}{400}\frac{L^{\#}(B)^2}{a^2B^3}+\frac{33}{400}\frac{BG^2}{a^2}+\frac{33}{400}\frac{K^2}{a^2B}$$
$$-\frac{1}{10}\frac{L\left(L^{\#}(B)\right)}{Ba^2}-\frac{3}{5}\frac{L(L(B))}{a^2}-\frac{3}{10}\frac{BL(G)}{a^2}-\frac{3}{10}\frac{L(K)}{a^2}+\frac{2}{5}\frac{L(A)}{a^2}$$
$$-\frac{3}{20}\frac{L^{\#}(G)}{a^2}-\frac{1}{20}\frac{L^{\#}(L(B))}{a^2B}+\frac{1}{5}\frac{L^{\#}(A)}{a^2B}-\frac{1}{20}\frac{L^{\#}\left(L^{\#}(B)\right)}{a^2B^2}-\frac{3}{20}\frac{L^{\#}(K)}{a^2B}$$
$$+\frac{1}{2}\frac{BF}{a^2}+\frac{\mathrm{I}D1}{a^2}$$

> $Inv := \frac{1}{2}\frac{L(B)}{\sqrt{B}}+\frac{3}{10}\sqrt{B}\,G-\frac{1}{10}\frac{L^{\#}(B)}{B^{3/2}}+\frac{2}{5}\frac{A}{\sqrt{B}}-\frac{3}{10}\frac{K}{\sqrt{B}};$

$$Inv := \frac{1}{2}\frac{L(B)}{\sqrt{B}}+\frac{3}{10}\sqrt{B}\,G-\frac{1}{10}\frac{L^{\#}(B)}{B^{3/2}}+\frac{2}{5}\frac{A}{\sqrt{B}}-\frac{3}{10}\frac{K}{\sqrt{B}} \quad \textbf{(42)}$$

> $conjugue(Inv);$

$$\frac{1}{10}\frac{L^{\#}(B)}{B^{3/2}}+\frac{3}{10}\frac{K}{\sqrt{B}}-\frac{1}{2}\frac{L(B)}{\sqrt{B}}-\frac{2}{5}\frac{A}{\sqrt{B}}-\frac{3}{10}\sqrt{B}\,G \quad \textbf{(43)}$$

> $expand(Inv+conjugue(Inv));$

$$0 \quad \textbf{(44)}$$

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