

> restart :
 > with(DifferentialGeometry) :
 > with(Tools) : with(LinearAlgebra) :
 > DGsetup([z, y, u[1], u[2], u[3]], [a, b, b1, c, d, e, f, g, h, k], M, verbose);
 The following coordinates have been protected:
 [z, y, u₁, u₂, u₃, a, b, b1, c, d, e, f, g, h, k]
 The following vector fields have been defined and protected:
 [D_z, D_y, D_u₁, D_u₂, D_u₃, D_a, D_b, D_b1, D_c, D_d, D_e, D_f, D_g, D_h, D_k]
 The following differential 1-forms have been defined and protected:
 [dz, dy, du₁, du₂, du₃, da, db, db1, dc, dd, de, df, dg, dh, dk]
 frame name: M (1)

> Ma := Matrix([[a⁴, 0, 0, 0, 0], [f, a³, 0, 0, 0], [g, c, a², 0, 0], [h, d, b, a, 0], [k, e, b1, 0, a]]);

$$Ma := \begin{bmatrix} a^4 & 0 & 0 & 0 & 0 \\ f & a^3 & 0 & 0 & 0 \\ g & c & a^2 & 0 & 0 \\ h & d & b & a & 0 \\ k & e & b1 & 0 & a \end{bmatrix}$$
 (2)

M > MaInv := MatrixInverse(Ma) :
M > A := map(evalDG, (ExteriorDerivative(Ma).MaInv));

$$A := \left[\left[\frac{4 da}{a}, 0 dz, 0 dz, 0 dz, 0 dz \right], \right.$$
 (3)

$$\left[-\frac{3 f da}{a^5} + \frac{df}{a^4}, \frac{3 da}{a}, 0 dz, 0 dz, 0 dz \right],$$

$$\left[-\frac{2 (g a^3 - c f) da}{a^8} - \frac{f dc}{a^7} + \frac{dg}{a^4}, -\frac{2 c da}{a^4} + \frac{dc}{a^3}, \frac{2 da}{a}, 0 dz, 0 dz \right],$$

$$\left[-\frac{(h a^5 - d f a^2 - b g a^3 + b c f) da}{a^{10}} - \frac{(g a^3 - c f) db}{a^9} - \frac{f dd}{a^7} + \frac{dh}{a^4}, \right.$$

$$\left. -\frac{(d a^2 - b c) da}{a^6} - \frac{c db}{a^5} + \frac{dd}{a^3}, -\frac{b da}{a^3} + \frac{db}{a^2}, \frac{da}{a}, 0 dz \right],$$

$$\left[-\frac{(k a^5 - e f a^2 - b1 g a^3 + b1 c f) da}{a^{10}} - \frac{(g a^3 - c f) db1}{a^9} - \frac{f de}{a^7} + \frac{dk}{a^4}, \right.$$

$$\left. -\frac{(e a^2 - b1 c) da}{a^6} - \frac{c db1}{a^5} + \frac{de}{a^3}, -\frac{b1 da}{a^3} + \frac{db1}{a^2}, 0 dz, \frac{da}{a} \right]$$

> t[1] := $\frac{da}{a}$:
M > t[2] := $-\frac{b da}{a^3} + \frac{db}{a^2}$:

$$\begin{aligned}
\mathbf{M} > t[3] &:= -\frac{2c da}{a^4} + \frac{dc}{a^3} : \\
\mathbf{M} > t[4] &:= -\frac{(da^2 - bc) da}{a^6} - \frac{c db}{a^5} + \frac{dd}{a^3} : \\
\mathbf{M} > t[5] &:= -\frac{(ea^2 - b1c) da}{a^6} - \frac{c db1}{a^5} + \frac{de}{a^3} : \\
\mathbf{M} > t[6] &:= -\frac{3fda}{a^5} + \frac{df}{a^4} : \\
\mathbf{M} > t[7] &:= -\frac{2(ga^3 - cf) da}{a^8} - \frac{fdc}{a^7} + \frac{dg}{a^4} : \\
\mathbf{M} > t[8] &:= -\frac{(ha^5 - dfa^2 - bga^3 + bcf) da}{a^{10}} - \frac{(ga^3 - cf) db}{a^9} - \frac{fdd}{a^7} + \frac{dh}{a^4} : \\
\mathbf{M} > t[9] &:= -\frac{(ka^5 - efa^2 - b1ga^3 + b1cf) da}{a^{10}} - \frac{(ga^3 - cf) db1}{a^9} - \frac{fde}{a^7} + \frac{dk}{a^4} : \\
\mathbf{M} > t[10] &:= -\frac{b1 da}{a^3} + \frac{db1}{a^2} :
\end{aligned}$$

$$\mathbf{M} > V := \text{Vector}\left(\left[-\frac{1}{12} Iy^3 dz + \frac{1}{12} Iz^3 dy + \left(\frac{1}{4} z^2 + \frac{1}{2} zy + \frac{1}{4} y^2\right) du_1 + \left(-\frac{1}{4} z - \frac{1}{4} y\right) du_2 + \frac{1}{12} du_3, \frac{1}{4} Iy^2 dz - \frac{1}{4} Iz^2 dy + \left(-\frac{1}{2} z - \frac{1}{2} y\right) du_1 + \frac{1}{4} du_2, -\frac{1}{2} Iy dz + \frac{1}{2} Iz dy + \frac{1}{2} du_1, dz, dy\right]\right) :$$

$$\mathbf{M} > W := \text{Ma.V} :$$

$$\mathbf{M} > FD := \text{FrameData}([t[1], t[2], t[3], t[4], t[5], t[6], t[7], t[8], t[9], t[10], W[1], W[2], W[3], W[4], W[5]], N) :$$

$$\mathbf{M} > \text{DGsetup}(FD, [E], [\text{alpha}[1], \text{alpha}[2], \text{alpha}[3], \text{alpha}[4], \text{alpha}[5], \text{alpha}[6], \text{alpha}[7], \text{alpha}[8], \text{alpha}[9], \alpha^\# [2], \text{tau}, \text{sigma}, \text{rho}, \zeta, \zeta^\#], \text{verbose});$$

The following coordinates have been protected:

$$[z, y, u_1, u_2, u_3, a, b, b1, c, d, e, f, g, h, k]$$

The following vector fields have been defined and protected:

$$[E1, E2, E3, E4, E5, E6, E7, E8, E9, E10, E11, E12, E13, E14, E15]$$

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

$$[\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7, \alpha_8, \alpha_9, \alpha_2^\#, \tau, \sigma, \rho, \zeta, \zeta^\#]$$

frame name: N

(4)

$$\mathbf{N} > \text{ExteriorDerivative}(\text{tau});$$

$$\begin{aligned}
4\alpha_1 \wedge \tau + \frac{(-gb1 - gb + a^2 h + a^2 k) \tau \wedge \sigma}{a^6} + \frac{f(b + b1) \tau \wedge \rho}{a^6} - \frac{f\tau \wedge \zeta}{a^4} - \frac{f\tau \wedge \zeta^\#}{a^4} \\
- \frac{(b + b1) \sigma \wedge \rho}{a^2} + \sigma \wedge \zeta + \sigma \wedge \zeta^\#
\end{aligned}$$

(5)

$$\mathbf{N} > \text{ExteriorDerivative}(\text{sigma});$$

$$\begin{aligned}
& 3\alpha_1 \wedge \sigma + \alpha_6 \wedge \tau \tag{6} \\
& - \frac{(fblg + fbg + ca^3h - ea^3g + ca^3k - da^3g - fa^2k - fa^2h) \tau \wedge \sigma}{a^{10}} \\
& + \frac{(blf^2 + bf^2 - ea^3f - dfa^3 + ka^6 + ha^6) \tau \wedge \rho}{a^{10}} - \frac{(ga^4 - acf + f^2) \tau \wedge \zeta}{a^8} \\
& - \frac{(ga^4 - acf + f^2) \tau \wedge \zeta^\#}{a^8} + \frac{(a^3e + da^3 - bf - blf) \sigma \wedge \rho}{a^6} - \frac{(ac - f) \sigma \wedge \zeta}{a^4} \\
& - \frac{(ac - f) \sigma \wedge \zeta^\#}{a^4} + \rho \wedge \zeta + \rho \wedge \zeta^\#
\end{aligned}$$

N > ExteriorDerivative(rho);

$$\begin{aligned}
& 2\alpha_1 \wedge \rho + \alpha_3 \wedge \sigma + \alpha_7 \wedge \tau - \frac{1}{a^{10}} ((Ieabg + Iblcah - Idabl g - Ibca k - egc \\
& - dgc + Ida^3k - Iea^3h + c^2k + c^2h - ga^2k - ga^2h + g^2bl + g^2b) \tau \wedge \sigma) \tag{7} \\
& - \frac{1}{a^{10}} ((ecf - ca^3k - ca^3h + dcf - fblg - fbg + Ib a^4k - Ibl a^4h + Ibl da f \\
& - Ibeaf) \tau \wedge \rho) \\
& + \frac{(-Iea^3f - Ia^4blg + Iblcaf + Ia^6k - ga^3c + c^2f - ga^2f) \tau \wedge \zeta}{a^{10}} \\
& - \frac{(Ia^6h + Ibcaf - Ia^4bg - Ida^3f + ga^3c - c^2f + ga^2f) \tau \wedge \zeta^\#}{a^{10}} \\
& - \frac{(gb + gbl - ce - cd - Ibl da + Ibea) \sigma \wedge \rho}{a^6} \\
& + \frac{(-Iblca + Iea^3 + ga^2 - c^2) \sigma \wedge \zeta}{a^6} - \frac{(Ida^3 - ga^2 - Ibca + c^2) \sigma \wedge \zeta^\#}{a^6} \\
& + \frac{(c + Ibl a) \rho \wedge \zeta}{a^3} - \frac{(-c + Iba) \rho \wedge \zeta^\#}{a^3} + I\zeta \wedge \zeta^\#
\end{aligned}$$

N > ExteriorDerivative(zeta);

$$\begin{aligned}
& \alpha_1 \wedge \zeta + \alpha_2 \wedge \rho + \alpha_4 \wedge \sigma + \alpha_8 \wedge \tau - \frac{1}{a^{11}} ((acd k + acdh - eag d + hablg + habg \\
& + Ieb^2g + Ida^2kb - Iea^2hb - Ib^2ck + Iblchb - Idblgb - h^2a^3 - d^2ag \\
& - ha^3k) \tau \wedge \sigma) - \frac{1}{a^{11}} ((ad^2f + adef - blhaf - bhaf + Ika^3b^2 - a^4dk \\
& - a^4dh + Ibldfb - Iblha^3b - Iefb^2) \tau \wedge \rho) \tag{8} \\
& + \frac{(acfd + Ika^5b - ga^4d - ha^3f - Iefa^2b - Iblga^3b + Iblcfb) \tau \wedge \zeta}{a^{11}}
\end{aligned}$$

$$\begin{aligned}
& - \frac{(-acfd + ga^4d + ha^3f - Idfa^2b + Iha^5b - Ib^2ga^3 + Ib^2cf) \tau \wedge \zeta^\#}{a^{11}} \\
& - \frac{(blha + Ieb^2 - a^2d - Ibl db - ade + bha) \sigma \wedge \rho}{a^7} \\
& + \frac{(ha^3 + Iea^2b - Ibl cb - acd) \sigma \wedge \zeta}{a^7} \\
& - \frac{(-ha^3 + Ida^2b - Ib^2c + acd) \sigma \wedge \zeta^\#}{a^7} + \frac{(ad + Ibl b) \rho \wedge \zeta}{a^4} \\
& - \frac{(-ad + Ib^2) \rho \wedge \zeta^\#}{a^4} + \frac{Ib \zeta \wedge \zeta^\#}{a^2}
\end{aligned}$$

N > ExteriorDerivative($\zeta^\#$);

$$\begin{aligned}
& \alpha_1 \wedge \zeta^\# + \alpha_5 \wedge \sigma + \alpha_9 \wedge \tau + \alpha_2^\# \wedge \rho - \frac{1}{a^{11}} ((Ieblgb - Ibckbl - eagd - e^2ag \\
& - k^2a^3 + acek + aceh + kabl g + kabg + Ib l^2 ch + Ida^2 kbl - Iea^2 hbl \\
& - Idbl^2 g - ha^3 k) \tau \wedge \sigma) - \frac{1}{a^{11}} ((adef - a^4 ek + a^2 f - Ibe fbl - a^4 eh \\
& - blka f - bka f - Iha^3 bl^2 + Idfbl^2 + Ibka^3 bl) \tau \wedge \rho) \\
& + \frac{(-ga^4 e - ka^3 f - Iefa^2 bl + acfe - Ib l^2 ga^3 + Ib l^2 cf + Ika^5 bl) \tau \wedge \zeta}{a^{11}} \\
& - \frac{(ga^4 e + ka^3 f - Idfa^2 bl - acfe + Iha^5 bl - Ibl ga^3 b + Ibl cfb) \tau \wedge \zeta^\#}{a^{11}} \\
& - \frac{(bka - Idbl^2 - ae^2 + Ibebl + blka - ade) \sigma \wedge \rho}{a^7} \\
& + \frac{(ka^3 - ace + Iea^2 bl - Ib l^2 c) \sigma \wedge \zeta}{a^7} \\
& - \frac{(-ka^3 + Ida^2 bl + ace - Ibl cb) \sigma \wedge \zeta^\#}{a^7} + \frac{(ae + Ib l^2) \rho \wedge \zeta}{a^4} \\
& - \frac{(-ae + Ib l b) \rho \wedge \zeta^\#}{a^4} + \frac{Ibl \zeta \wedge \zeta^\#}{a^2}
\end{aligned} \tag{9}$$

frame2 > List := GenerateForms([alpha[1], alpha[2], alpha[3], alpha[4],
alpha[5], alpha[6], alpha[7], alpha[8], alpha[9], $\alpha^\#[2]$, tau, sigma,
rho, zeta, $\zeta^\#[1]$], 2) :

frame2 > Torsion := **proc**(S, i, j) **local** k, X; k := 15 · (i - 1) - $\frac{i \cdot (i - 1)}{2}$ + 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 105 do $X := X + t[k] \cdot List[k]$ od; X; end
proc:

N > result(ExteriorDerivative(tau));

$$4\alpha_1 \wedge \tau + \left(-\frac{gbl}{a^6} - \frac{gb}{a^6} + \frac{h}{a^4} + \frac{k}{a^4} \right) \tau \wedge \sigma + \left(\frac{fb}{a^6} + \frac{fbl}{a^6} \right) \tau \wedge \rho - \frac{f\tau \wedge \zeta}{a^4} - \frac{f\tau \wedge \zeta^\#}{a^4} + \left(-\frac{b}{a^2} - \frac{bl}{a^2} \right) \sigma \wedge \rho + \sigma \wedge \zeta + \sigma \wedge \zeta^\# \quad (10)$$

N > result(ExteriorDerivative(sigma));

$$3\alpha_1 \wedge \sigma + \alpha_6 \wedge \tau + \left(-\frac{fblg}{a^{10}} - \frac{fbg}{a^{10}} - \frac{ch}{a^7} + \frac{eg}{a^7} - \frac{ck}{a^7} + \frac{dg}{a^7} + \frac{fk}{a^8} + \frac{fh}{a^8} \right) \tau \wedge \sigma + \left(\frac{blf^2}{a^{10}} + \frac{bf^2}{a^{10}} - \frac{ef}{a^7} - \frac{df}{a^7} + \frac{k}{a^4} + \frac{h}{a^4} \right) \tau \wedge \rho + \left(-\frac{g}{a^4} + \frac{cf}{a^7} - \frac{f^2}{a^8} \right) \tau \wedge \zeta + \left(-\frac{g}{a^4} + \frac{cf}{a^7} - \frac{f^2}{a^8} \right) \tau \wedge \zeta^\# + \left(\frac{e}{a^3} + \frac{d}{a^3} - \frac{fb}{a^6} - \frac{fbl}{a^6} \right) \sigma \wedge \rho + \left(-\frac{c}{a^3} + \frac{f}{a^4} \right) \sigma \wedge \zeta + \left(-\frac{c}{a^3} + \frac{f}{a^4} \right) \sigma \wedge \zeta^\# + \rho \wedge \zeta + \rho \wedge \zeta^\# \quad (11)$$

N > result(ExteriorDerivative(rho));

$$2\alpha_1 \wedge \rho + \alpha_3 \wedge \sigma + \alpha_7 \wedge \tau + \left(-\frac{Iebg}{a^9} - \frac{Iblch}{a^9} + \frac{Idblg}{a^9} + \frac{Ibck}{a^9} + \frac{egc}{a^{10}} + \frac{dgc}{a^{10}} - \frac{Idk}{a^7} + \frac{Ieh}{a^7} - \frac{c^2k}{a^{10}} - \frac{c^2h}{a^{10}} + \frac{gk}{a^8} + \frac{gh}{a^8} - \frac{g^2bl}{a^{10}} - \frac{g^2b}{a^{10}} \right) \tau \wedge \sigma + \left(-\frac{ecf}{a^{10}} + \frac{ck}{a^7} + \frac{ch}{a^7} - \frac{dcf}{a^{10}} + \frac{fblg}{a^{10}} + \frac{fbg}{a^{10}} - \frac{Ibk}{a^6} + \frac{Iblh}{a^6} - \frac{Ibl df}{a^9} + \frac{Ibef}{a^9} \right) \tau \wedge \rho + \left(-\frac{Ief}{a^7} - \frac{Iblg}{a^6} + \frac{Iblcf}{a^9} + \frac{Ik}{a^4} - \frac{gc}{a^7} + \frac{c^2f}{a^{10}} - \frac{gf}{a^8} \right) \tau \wedge \zeta + \left(-\frac{Ih}{a^4} - \frac{Ibcf}{a^9} + \frac{Ibg}{a^6} + \frac{Idf}{a^7} - \frac{gc}{a^7} + \frac{c^2f}{a^{10}} - \frac{gf}{a^8} \right) \tau \wedge \zeta^\# + \left(-\frac{gb}{a^6} - \frac{gbl}{a^6} + \frac{ce}{a^6} + \frac{cd}{a^6} + \frac{Ibld}{a^5} - \frac{Ibe}{a^5} \right) \sigma \wedge \rho + \left(-\frac{Iblc}{a^5} + \frac{Ie}{a^3} + \frac{g}{a^4} - \frac{c^2}{a^6} \right) \sigma \wedge \zeta + \left(-\frac{Id}{a^3} + \frac{g}{a^4} + \frac{Ibc}{a^5} - \frac{c^2}{a^6} \right) \sigma \wedge \zeta^\# + \left(\frac{c}{a^3} + \frac{Ibl}{a^2} \right) \rho \wedge \zeta + \left(\frac{c}{a^3} - \frac{Ib}{a^2} \right) \rho \wedge \zeta^\# + I\zeta \wedge \zeta^\# \quad (12)$$

N > result(ExteriorDerivative(zeta));

$$\alpha_1 \wedge \zeta + \alpha_2 \wedge \rho + \alpha_4 \wedge \sigma + \alpha_8 \wedge \tau + \left(-\frac{cdk}{a^{10}} - \frac{cdh}{a^{10}} + \frac{egd}{a^{10}} - \frac{hblg}{a^{10}} - \frac{hbg}{a^{10}} - \frac{Ieb^2g}{a^{11}} - \frac{Idkb}{a^9} + \frac{Iehb}{a^9} + \frac{Ib^2ck}{a^{11}} - \frac{Iblchb}{a^{11}} + \frac{Idblgb}{a^{11}} + \frac{h^2}{a^8} + \frac{d^2g}{a^{10}} \right) \quad (13)$$

$$\begin{aligned}
& + \frac{hk}{a^8} \Big) \tau \wedge \sigma + \left(-\frac{d^2f}{a^{10}} - \frac{def}{a^{10}} + \frac{blhf}{a^{10}} + \frac{bhf}{a^{10}} - \frac{Ikb^2}{a^8} + \frac{dk}{a^7} + \frac{dh}{a^7} \right. \\
& - \frac{Ibl dfb}{a^{11}} + \frac{Ibl hb}{a^8} + \frac{Iefb^2}{a^{11}} \Big) \tau \wedge \rho + \left(\frac{dcf}{a^{10}} + \frac{Ibk}{a^6} - \frac{dg}{a^7} - \frac{fh}{a^8} - \frac{Ibef}{a^9} \right. \\
& - \frac{Ibl gb}{a^8} + \frac{Ibl cfb}{a^{11}} \Big) \tau \wedge \zeta + \left(\frac{dcf}{a^{10}} - \frac{dg}{a^7} - \frac{fh}{a^8} + \frac{Idfb}{a^9} - \frac{Ihb}{a^6} + \frac{Ib^2g}{a^8} \right. \\
& - \frac{Ib^2cf}{a^{11}} \Big) \tau \wedge \zeta^\# + \left(-\frac{blh}{a^6} - \frac{Ieb^2}{a^7} + \frac{d^2}{a^6} + \frac{Ibl db}{a^7} + \frac{de}{a^6} - \frac{hb}{a^6} \right) \sigma \wedge \rho \\
& + \left(\frac{h}{a^4} + \frac{Ibe}{a^5} - \frac{Ibl cb}{a^7} - \frac{cd}{a^6} \right) \sigma \wedge \zeta + \left(\frac{h}{a^4} - \frac{Idb}{a^5} + \frac{Ib^2c}{a^7} - \frac{cd}{a^6} \right) \sigma \wedge \zeta^\# \\
& + \left(\frac{d}{a^3} + \frac{Ibl b}{a^4} \right) \rho \wedge \zeta + \left(\frac{d}{a^3} - \frac{Ib^2}{a^4} \right) \rho \wedge \zeta^\# + \frac{Ib \zeta \wedge \zeta^\#}{a^2}
\end{aligned}$$

N > *result*(*ExteriorDerivative*($\zeta^\#$));

$$\begin{aligned}
\alpha_1 \wedge \zeta^\# + \alpha_5 \wedge \sigma + \alpha_9 \wedge \tau + \alpha_2^\# \wedge \rho + & \left(-\frac{Iebl gb}{a^{11}} + \frac{Ibckbl}{a^{11}} + \frac{egd}{a^{10}} + \frac{e^2g}{a^{10}} + \frac{k^2}{a^8} \right. \\
& - \frac{cek}{a^{10}} - \frac{ceh}{a^{10}} - \frac{kblg}{a^{10}} - \frac{kbg}{a^{10}} - \frac{Ibl^2ch}{a^{11}} - \frac{Idkbl}{a^9} + \frac{Iehbl}{a^9} + \frac{Idbl^2g}{a^{11}} \\
& + \frac{hk}{a^8} \Big) \tau \wedge \sigma + \left(-\frac{def}{a^{10}} + \frac{ek}{a^7} - \frac{e^2f}{a^{10}} + \frac{Ibefbl}{a^{11}} + \frac{eh}{a^7} + \frac{blkf}{a^{10}} + \frac{bkf}{a^{10}} \right. \\
& + \frac{Ihbl^2}{a^8} - \frac{Idfbl^2}{a^{11}} - \frac{Ibkbl}{a^8} \Big) \tau \wedge \rho + \left(-\frac{eg}{a^7} - \frac{fk}{a^8} - \frac{Iefbl}{a^9} + \frac{ecf}{a^{10}} \right. \\
& - \frac{Ibl^2g}{a^8} + \frac{Ibl^2cf}{a^{11}} + \frac{Ikbbl}{a^6} \Big) \tau \wedge \zeta + \left(-\frac{eg}{a^7} - \frac{fk}{a^8} + \frac{Ibl df}{a^9} + \frac{ecf}{a^{10}} - \frac{Ibl h}{a^6} \right. \\
& + \frac{Ibl gb}{a^8} - \frac{Ibl cfb}{a^{11}} \Big) \tau \wedge \zeta^\# + \left(-\frac{bk}{a^6} + \frac{Idbl^2}{a^7} + \frac{e^2}{a^6} - \frac{Iebl}{a^7} - \frac{kbl}{a^6} \right. \\
& + \frac{de}{a^6} \Big) \sigma \wedge \rho + \left(\frac{k}{a^4} - \frac{ce}{a^6} + \frac{Iebl}{a^5} - \frac{Ibl^2c}{a^7} \right) \sigma \wedge \zeta + \left(\frac{k}{a^4} - \frac{Ibl d}{a^5} - \frac{ce}{a^6} \right. \\
& + \frac{Ibl cb}{a^7} \Big) \sigma \wedge \zeta^\# + \left(\frac{e}{a^3} + \frac{Ibl^2}{a^4} \right) \rho \wedge \zeta + \left(\frac{e}{a^3} - \frac{Ibl b}{a^4} \right) \rho \wedge \zeta^\# + \frac{Ibl \zeta \wedge \zeta^\#}{a^2}
\end{aligned} \tag{14}$$

N >