

[> restart
 [> with(DifferentialGeometry) : with(JetCalculus) :
 [> DGsetup([x, t], [u], E, 1) :

$$\begin{aligned}
 \mathbf{E} > & \frac{1}{(u_1 - u_2)^3 \cdot (u_1 + u_2)^3} \left((x \cdot u_1^3 - 3 \cdot u_2 \cdot t \cdot u_1^2 + 3 \cdot u_2^2 \cdot x \cdot u_1 - u_2^3 \cdot t) \cdot ((1 - 2 \cdot u_{[1]}) \cdot (-u_{1,1} \right. \\
 & \left. + u_{2,2}) + 2 \cdot u_{[1]} \cdot (u_2^2 - u_1^2)) \right) \\
 & \frac{(-3 t u_1^2 u_2 - t u_2^3 + x u_1^3 + 3 x u_1 u_2^2) ((-2 u_{[1]}^2 + 1) (-u_{1,1} + u_{2,2}) + 2 u_{[1]} (-u_1^2 + u_2^2))}{(u_1 - u_2)^3 (u_1 + u_2)^3} \quad (1.1)
 \end{aligned}$$

$$\begin{aligned}
 \mathbf{E} > & \\
 \mathbf{E} > & A := \text{evalDG}((1.1) \text{ Dx \&w Dt}) \\
 A := & - \left(\frac{1}{(u_1 - u_2)^3 (u_1 + u_2)^3} \left((3 u_2 t u_1^2 + u_2^3 t - x u_1^3 - 3 u_2^2 x u_1) (2 u_{[1]}^2 u_{1,1} \right. \right. \\
 & \left. \left. - 2 u_{[1]}^2 u_{2,2} - 2 u_{[1]} u_1^2 + 2 u_{[1]} u_2^2 - u_{1,1} + u_{2,2}) \text{ Dx} \right) \wedge \text{Dt} \right) \quad (1.2)
 \end{aligned}$$

$$\begin{aligned}
 \mathbf{E} > & \text{simplify}(\text{HorizontalHomotopy}(A)) \\
 & - \left(\left(\frac{1}{(u_1 - u_2)^3 (u_1 + u_2)^3} \left(t \int_0^1 \left(-\infty (u_1 + u_2) (1 + (u_{2,2} + u_{1,1,2} + u_{1,2,2} + u_2 \right. \right. \right. \right. \\
 & \left. \left. \left. + u_{1,2}) _z1 _z1 (u_1 - u_2) (u_1^4 + u_2^4) \text{ signum} \left(1, \right. \right. \right. \right. \\
 & \left. \left. \left. \frac{1}{_z1^2 (u_1 - u_2)^4 (u_1 + u_2)^4} \left(_z1 t u_2^6 + (-3 _z1 x u_1 - u_{[1]}) u_2^5 + 3 _z1 \left(\frac{2 t u_1^2}{3} \right. \right. \right. \right. \\
 & \left. \left. \left. + u_{[1]} (t u_{1,1} + x u_{1,2}) \right) u_2^4 - 12 \left(-\frac{_z1 x u_1^2}{6} + \frac{u_{[1]} u_1}{6} + _z1 u_{[1]} (t u_{1,2} \right. \right. \right. \\
 & \left. \left. \left. + x u_{1,1}) \right) u_1 u_2^3 + 18 _z1 u_1^2 \left(-\frac{t u_1^2}{6} + u_{[1]} (t u_{1,1} + x u_{1,2}) \right) u_2^2 - 12 u_1^3 \left(-\frac{_z1 x u_1^2}{12} \right. \right. \right.
 \end{aligned} \quad (1.3)$$

$$\begin{aligned}
& - \frac{u[] u_1}{4} + _z l u[] (t u_{1,2} + x u_{1,1}) \Big) u_2 + 3 _z l u[] u_1^4 (t u_{1,1} + x u_{1,2}) \Big) \Big) \\
& + \infty (u_1 + u_2) _z l (1 + (u_{1,1,2} + u_{1,2,2} + u_1 + u_{1,1} + u_{1,2}) _z l) (u_1 - u_2) (u_1^4 + \\
& u_2^4) \operatorname{signum} \left(1, \frac{1}{_z l^2 (u_1 - u_2)^4 (u_1 + u_2)^4} \left(_z l x u_1^6 + (-3 _z l t u_2 - u[]) u_1^5 \right. \right. \\
& \left. \left. + 3 _z l \left(\frac{2 x u_2^2}{3} + u[] (t u_{1,2} + x u_{2,2}) \right) u_1^4 - 12 u_2 \left(-\frac{t _z l u_2^2}{6} + \frac{u[] u_2}{6} \right. \right. \right. \\
& \left. \left. \left. + _z l u[] (t u_{2,2} + x u_{1,2}) \right) u_1^3 + 18 _z l u_2^2 \left(-\frac{x u_2^2}{6} + u[] (t u_{1,2} + x u_{2,2}) \right) u_1^2 \right. \right. \\
& \left. \left. - 12 \left(-\frac{t _z l u_2^2}{12} - \frac{u[] u_2}{4} + _z l u[] (t u_{2,2} + x u_{1,2}) \right) u_2^3 u_1 + 3 _z l u[] u_2^4 (t u_{1,2} \right. \right. \\
& \left. \left. \left. + x u_{2,2}) \right) \right) \right) + 6 \left(u[] (u_1^2 - u_2^2 + u[] (-u_{1,1} + u_{2,2})) _z l^2 - \frac{u_{2,2}}{2} + \frac{u_{1,1}}{2} \right) \left(t \right. \\
& \left. u_1^2 u_2 + \frac{1}{3} t u_2^3 - \frac{1}{3} x u_1^3 - x u_1 u_2^2 \right) \Big) d_z l \Big) \\
& + \operatorname{signum} \left(\frac{1}{(u_1 - u_2)^4 (u_1 + u_2)^4} \left(t u_2^6 + (-3 x u_1 - u[]) u_2^5 + (2 t u_1^2 \right. \right. \\
& \left. \left. + 3 u[] (t u_{1,1} + x u_{1,2}) \right) u_2^4 + (2 x u_1^3 - 2 u[] u_1^2 - 12 u[] (t u_{1,2} + x u_{1,1}) u_1 \right) u_2^3 \right. \\
& \left. \left. + 18 \left(-\frac{t u_1^2}{6} + u[] (t u_{1,1} + x u_{1,2}) \right) u_1^2 u_2^2 + (x u_1^5 + 3 u[] u_1^4 - 12 u[] (t u_{1,2} \right. \right. \right. \\
& \left. \left. \left. + x u_{1,1}) u_1^3 \right) u_2 + 3 u[] u_1^4 (t u_{1,1} + x u_{1,2}) \right) \right) \Big) \infty \Big) Dx \Big)
\end{aligned}$$

$$\begin{aligned}
& + \left(\frac{1}{(u_1 - u_2)^3 (u_1 + u_2)^3} \left(x \left(\int_0^1 \left(-\infty (u_1 + u_2) (1 + (u_{2,2} + u_{1,1,2} + u_{1,2,2} + u_2 \right. \right. \right. \right. \\
& \left. \left. \left. \left. + u_{1,2} \right) \right) \right) \right) \left(u_1 - u_2 \right) \left(u_1^4 + u_2^4 \right) \operatorname{signum} \left(1, \right. \\
& \left. \frac{1}{_z l^2 (u_1 - u_2)^4 (u_1 + u_2)^4} \left(_z l t u_2^6 + (-3 _z l x u_1 - u[]) u_2^5 + 3 _z l \left(\frac{2 t u_1^2}{3} \right. \right. \right. \\
& \left. \left. \left. + u[] (t u_{1,1} + x u_{1,2}) \right) u_2^4 - 12 \left(-\frac{_z l x u_1^2}{6} + \frac{u[] u_1}{6} + _z l u[] (t u_{1,2} \right. \right. \right. \\
& \left. \left. \left. + x u_{1,1}) \right) u_1 u_2^3 + 18 _z l u_1^2 \left(-\frac{t u_1^2}{6} + u[] (t u_{1,1} + x u_{1,2}) \right) u_2^2 - 12 u_1^3 \left(-\frac{_z l x u_1^2}{12} \right. \right. \\
& \left. \left. \left. - \frac{u[] u_1}{4} + _z l u[] (t u_{1,2} + x u_{1,1}) \right) u_2 + 3 _z l u[] u_1^4 (t u_{1,1} + x u_{1,2}) \right) \right) \\
& + \infty (u_1 + u_2) _z l (1 + (u_{1,1,2} + u_{1,2,2} + u_1 + u_{1,1} + u_{1,2}) _z l) (u_1 - u_2) (u_1^4 + \\
& u_2^4) \operatorname{signum} \left(1, \frac{1}{_z l^2 (u_1 - u_2)^4 (u_1 + u_2)^4} \left(_z l x u_1^6 + (-3 _z l t u_2 - u[]) u_1^5 \right. \right. \\
& \left. \left. + 3 _z l \left(\frac{2 x u_2^2}{3} + u[] (t u_{1,2} + x u_{2,2}) \right) u_1^4 - 12 u_2 \left(-\frac{t _z l u_2^2}{6} + \frac{u[] u_2}{6} \right. \right. \right. \\
& \left. \left. \left. + _z l u[] (t u_{2,2} + x u_{1,2}) \right) u_1^3 + 18 _z l u_2^2 \left(-\frac{x u_2^2}{6} + u[] (t u_{1,2} + x u_{2,2}) \right) u_1^2 \right. \\
& \left. - 12 \left(-\frac{t _z l u_2^2}{12} - \frac{u[] u_2}{4} + _z l u[] (t u_{2,2} + x u_{1,2}) \right) u_2^3 u_1 + 3 _z l u[] u_2^4 (t u_{1,2} \right. \\
\end{aligned}$$

$$\begin{aligned}
& + x u_{2,2} \Big) \Big) + 6 \left(u_{1,1} (u_1^2 - u_2^2 + u_{1,1} (-u_{1,1} + u_{2,2})) - z t^2 - \frac{u_{2,2}}{2} + \frac{u_{1,1}}{2} \right) \left(t \right. \\
& \left. u_1^2 u_2 + \frac{1}{3} t u_2^3 - \frac{1}{3} x u_1^3 - x u_1 u_2^2 \right) d_z l \Big) \\
& - \text{signum} \left(\frac{1}{(u_1 - u_2)^4 (u_1 + u_2)^4} \left(x u_1^6 + (-3 t u_2 - u_{1,1}) u_1^5 + (2 x u_2^2 \right. \right. \\
& \left. \left. + 3 u_{1,1} (t u_{1,2} + x u_{2,2}) \right) u_1^4 + (2 t u_2^3 - 2 u_{1,1} u_2^2 - 12 u_{1,1} (t u_{2,2} + x u_{1,2}) u_2) u_1^3 \right. \\
& \left. + 18 \left(-\frac{x u_2^2}{6} + u_{1,1} (t u_{1,2} + x u_{2,2}) \right) u_2^2 u_1^2 + (t u_2^5 + 3 u_{1,1} u_2^4 - 12 u_{1,1} (t u_{2,2} \right. \right. \\
& \left. \left. + x u_{1,2}) u_2^3) u_1 + 3 u_{1,1} (t u_{1,2} + x u_{2,2}) u_2^4 \right) \right) \infty \Big) Dt
\end{aligned}$$

E >
 >
 E >
 E >