

Summary of symmetry calculations

October 25, 2021

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Chapter 1

DBH_model

Run 04_10PM_25_October-2021

Degree in tangential ansätze: 2.
The system of ODEs is given by:

$$\begin{aligned}\frac{dw_1}{dt} &= -w_1w_2 - w_1w_3 + w_2w_3, \\ \frac{dw_2}{dt} &= -w_1w_2 + w_1w_3 - w_2w_3, \\ \frac{dw_3}{dt} &= w_1w_2 - w_1w_3 - w_2w_3.\end{aligned}$$

The calculated generators are:

Solving the algebraic equations

Solving equation:

$$-C_3 = 0$$

Arguments: $[-1, C_3]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_3 = 0$$

Solving equation:

$$-C_2t - C_4t - C_5 + C_7t = 0$$

Arguments: $[-C_5, C_7t, -C_2t, -C_4t]$ Arbitrary functions: \square Basis functions: $[-t, 1]$ Solutions:

$$C_2 = -C_4$$

$$C_5 = C_7t$$

Solving equation:

$$-C_6 = 0$$

Arguments: $[-1, C_6]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_6 = 0$$

Solving equation:

$$2C_4t - C_7t - C_8 = 0$$

Arguments: $[-C_8, -C_7t, 2C_4t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_7 &= 0 \\ C_4 &= \frac{C_8}{2t} \end{aligned}$$

Solving equation:

$$-C_8 - C_9 = 0$$

Arguments: $[-C_8, -C_9]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_8 = -C_9$$

Solving equation:

$$-C_{10} = 0$$

Arguments: $[-1, C_{10}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{10} = 0$$

Solving equation:

$$-C_{11}t^2 + C_{12}t - C_{13} + C_{21}t^2 - C_{22}t = 0$$

Arguments: $[-C_{13}, C_{12}t, C_{21}t^2, -C_{11}t^2, -C_{22}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, t^2, 1]$ Solutions:

$$\begin{aligned} C_{22} &= 0 \\ C_{11} &= C_{21} \\ C_{12} &= \frac{C_{13}}{t} \end{aligned}$$

Solving equation:

$$-C_{15} + 2C_{17}t + C_{21}t^2 - C_{31}t^2 - 2C_{32}t + C_{40} = 0$$

Arguments: $[C_{40}, -C_{15}, C_{21}t^2, -C_{31}t^2, -2C_{32}t, 2C_{17}t]$ Arbitrary functions: $[]$ Basis functions: $[-2t, 1, t^2]$ Solutions:

$$\begin{aligned} C_{32} &= 0 \\ C_{21} &= C_{31} \\ C_{15} &= 2C_{17}t + C_{40} \end{aligned}$$

Solving equation:

$$C_{14}t - C_{16} - C_{34}t = 0$$

Arguments: $[-C_{16}, C_{14}t, -C_{34}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_{34} &= 0 \\ C_{14} &= \frac{C_{16}}{t} \end{aligned}$$

Solving equation:

$$-C_{13} + C_{16} - C_{17}t - C_{18} - C_{24}t - C_{27}t - C_{40} = 0$$

Arguments: $[C_{16}, -C_{13}, -C_{18}, -C_{40}, -C_{17}t, -C_{24}t, -C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_{17} &= -C_{24} - C_{27} \\ C_{13} &= C_{16} - C_{18} - C_{40} \end{aligned}$$

Solving equation:

$$-C_{18} - C_{19} + C_{24}t + C_{27}t - C_{37}t - 2C_{40} = 0$$

Arguments: $[-C_{18}, -C_{19}, -2C_{40}, C_{24}t, C_{27}t, -C_{37}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_{37} &= 0 \\ C_{18} &= -C_{19} + C_{24}t + C_{27}t - 2C_{40} \end{aligned}$$

Solving equation:

$$-C_{20} + C_{27}t = 0$$

Arguments: $[-C_{20}, C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{27} &= 0 \\ C_{20} &= 0 \end{aligned}$$

Solving equation:

$$-C_{16} - C_{19} - C_{23} + C_{24}t - C_{40} = 0$$

Arguments: $[-C_{16}, -C_{19}, -C_{23}, -C_{40}, C_{24}t]$ Arbitrary functions: $[]$ Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{24} &= 0 \\ C_{16} &= -C_{19} - C_{23} - C_{40} \end{aligned}$$

Solving equation:

$$C_{19} - C_{25} = 0$$

Arguments: $[C_{19}, -C_{25}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{19} = C_{25}$$

Solving equation:

$$-C_{23} - C_{25} - C_{26} - C_{40} = 0$$

Arguments: $[-C_{23}, -C_{25}, -C_{26}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{23} = -C_{25} - C_{26} - C_{40}$$

Solving equation:

$$-C_{28} + C_{40} = 0$$

Arguments: $[C_{40}, -C_{28}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{28} = C_{40}$$

Solving equation:

$$-C_{29} - C_{40} = 0$$

Arguments: $[-C_{29}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{29} = -C_{40}$$

Solving equation:

$$-C_{30} = 0$$

Arguments: $[-1, C_{30}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{30} = 0$$

Solving equation:

$$C_{25} + C_{26} - C_{33} + C_{40} = 0$$

Arguments: $[C_{25}, C_{26}, C_{40}, -C_{33}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{25} = -C_{26} + C_{33} - C_{40}$$

Solving equation:

$$C_{26} - C_{33} - C_{35} - C_{40} = 0$$

Arguments: $[C_{26}, -C_{33}, -C_{35}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{26} = C_{33} + C_{35} + C_{40}$$

Solving equation:

$$-C_{33} - C_{35} - C_{36} - C_{40} = 0$$

Arguments: $[-C_{33}, -C_{35}, -C_{36}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{33} = -C_{35} - C_{36} - C_{40}$$

Solving equation:

$$-C_{38} - C_{40} = 0$$

Arguments: $[-C_{38}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{38} = -C_{40}$$

Solving equation:

$$-C_{39} = 0$$

Arguments: $[-1, C_{39}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{39} = 0$$

$$X_1 = (t + 2) \partial t + (1 - 2tw_1) \partial w_1 + (1 - 2tw_2) \partial w_2 \\ + (1 - 2tw_3) \partial w_3$$

$$X_2 = (1) \partial t,$$

$$X_3 = (t) \partial t + (w_2w_3 f_1(t) - w_1w_2 f_1(t) - w_1w_3 f_1(t)) \partial w_1 + (w_1w_3 f_1(t) - w_1w_2 f_1(t) \\ + -w_2w_3 f_1(t)) \partial w_2 + (w_1w_2 f_1(t) - w_1w_3 f_1(t) - w_2w_3 f_1(t)) \partial w_3$$

Some of the generators might contain the following arbitrary functions:

$$f_1$$

WARNING:

Some of the calculated generators did not satisfy the linearised symmetry conditions. Thus, the presented list here is not complete and consists exclusively of the calculated generators that satisfy the linearised symmetry conditions.

The execution time of the script was:

0 hours 5 minutes 2 seconds.

Run 04_15PM_25_October-2021

Degree in tangential ansätze: 2.

The system of ODEs is given by:

$$\frac{dw_1}{dt} = -w_1w_2 - w_1w_3 + w_2w_3, \\ \frac{dw_2}{dt} = -w_1w_2 + w_1w_3 - w_2w_3, \\ \frac{dw_3}{dt} = w_1w_2 - w_1w_3 - w_2w_3.$$

The calculated generators are:

Solving the algebraic equations

Solving equation:

$$-C_3 = 0$$

Arguments: $[-1, C_3]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_3 = 0$$

Solving equation:

$$-C_2t - C_4t - C_5 + C_7t = 0$$

Arguments: $[-C_5, C_7t, -C_2t, -C_4t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$C_2 = -C_4$$

$$C_5 = C_7t$$

Solving equation:

$$-C_6 = 0$$

Arguments: $[-1, C_6]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_6 = 0$$

Solving equation:

$$2C_4t - C_7t - C_8 = 0$$

Arguments: $[-C_8, -C_7t, 2C_4t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$C_7 = 0$$

$$C_4 = \frac{C_8}{2t}$$

Solving equation:

$$-C_8 - C_9 = 0$$

Arguments: $[-C_8, -C_9]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_8 = -C_9$$

Solving equation:

$$-C_{10} = 0$$

Arguments: $[-1, C_{10}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{10} = 0$$

Solving equation:

$$-C_{11}t^2 + C_{12}t - C_{13} + C_{21}t^2 - C_{22}t = 0$$

Arguments: $[-C_{13}, C_{12}t, C_{21}t^2, -C_{11}t^2, -C_{22}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, t^2, 1]$ Solutions:

$$C_{22} = 0$$

$$C_{11} = C_{21}$$

$$C_{12} = \frac{C_{13}}{t}$$

Solving equation:

$$-C_{15} + 2C_{17}t + C_{21}t^2 - C_{31}t^2 - 2C_{32}t + C_{40} = 0$$

Arguments: $[C_{40}, -C_{15}, C_{21}t^2, -C_{31}t^2, -2C_{32}t, 2C_{17}t]$ Arbitrary functions: $[]$ Basis functions: $[1, t, t^2]$
 Solutions:

$$C_{17} = C_{32}$$

$$C_{21} = C_{31}$$

$$C_{15} = C_{40}$$

Solving equation:

$$C_{14}t - C_{16} - C_{34}t = 0$$

Arguments: $[-C_{16}, C_{14}t, -C_{34}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$C_{34} = 0$$

$$C_{14} = \frac{C_{16}}{t}$$

Solving equation:

$$-C_{13} + C_{16} - C_{18} - C_{24}t - C_{27}t + C_{32}t - C_{40} = 0$$

Arguments: $[C_{16}, -C_{13}, -C_{18}, -C_{40}, C_{32}t, -C_{24}t, -C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[1, t]$
 Solutions:

$$C_{24} = -C_{27} + C_{32}$$

$$C_{13} = C_{16} - C_{18} - C_{40}$$

Solving equation:

$$-C_{18} - C_{19} - C_{37}t - 2C_{40} = 0$$

Arguments: $[-C_{18}, -C_{19}, -2C_{40}, -C_{37}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$C_{37} = 0$$

$$C_{18} = -C_{19} - 2C_{40}$$

Solving equation:

$$-C_{20} + C_{27}t = 0$$

Arguments: $[-C_{20}, C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[t, 1]$ Solutions:

$$C_{27} = 0$$

$$C_{20} = 0$$

Solving equation:

$$-C_{16} - C_{19} - C_{23} - C_{40} = 0$$

Arguments: $[-C_{16}, -C_{19}, -C_{23}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{16} = -C_{19} - C_{23} - C_{40}$$

Solving equation:

$$C_{19} - C_{25} = 0$$

Arguments: $[C_{19}, -C_{25}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{19} = C_{25}$$

Solving equation:

$$-C_{23} - C_{25} - C_{26} - C_{40} = 0$$

Arguments: $[-C_{23}, -C_{25}, -C_{26}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{23} = -C_{25} - C_{26} - C_{40}$$

Solving equation:

$$-C_{28} + C_{40} = 0$$

Arguments: $[C_{40}, -C_{28}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{28} = C_{40}$$

Solving equation:

$$-C_{29} - C_{40} = 0$$

Arguments: $[-C_{29}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{29} = -C_{40}$$

Solving equation:

$$-C_{30} = 0$$

Arguments: $[-1, C_{30}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{30} = 0$$

Solving equation:

$$C_{25} + C_{26} - C_{33} + C_{40} = 0$$

Arguments: $[C_{25}, C_{26}, C_{40}, -C_{33}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{25} = -C_{26} + C_{33} - C_{40}$$

Solving equation:

$$C_{26} - C_{33} - C_{35} - C_{40} = 0$$

Arguments: $[C_{26}, -C_{33}, -C_{35}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{26} = C_{33} + C_{35} + C_{40}$$

Solving equation:

$$-C_{33} - C_{35} - C_{36} - C_{40} = 0$$

Arguments: $[-C_{33}, -C_{35}, -C_{36}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{33} = -C_{35} - C_{36} - C_{40}$$

Solving equation:

$$-C_{38} - C_{40} = 0$$

Arguments: $[-C_{38}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{38} = -C_{40}$$

Solving equation:

$$-C_{39} = 0$$

Arguments: $[-1, C_{39}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{39} = 0$$

$$X_1 = (t + 2) \partial t + (1 - 2tw_1) \partial w_1 + (1 - 2tw_2) \partial w_2 \\ + (1 - 2tw_3) \partial w_3$$

$$X_2 = (1) \partial t,$$

$$X_3 = (-1 + t) \partial t + (w_1) \partial w_1 + (w_2) \partial w_2 + (w_3) \partial w_3,$$

$$X_4 = (t) \partial t + (w_2 w_3 f_1(t) - w_1 w_2 f_1(t) - w_1 w_3 f_1(t)) \partial w_1 + (w_1 w_3 f_1(t) - w_1 w_2 f_1(t) \\ + -w_2 w_3 f_1(t)) \partial w_2 + (w_1 w_2 f_1(t) - w_1 w_3 f_1(t) - w_2 w_3 f_1(t)) \partial w_3$$

Some of the generators might contain the following arbitrary functions:

$$f_1$$

WARNING:

Some of the calculated generators did not satisfy the linearised symmetry conditions. Thus, the presented list here is not complete and consists exclusively of the calculated generators that satisfy the linearised symmetry conditions.

The execution time of the script was:

0 hours 5 minutes 2 seconds.

Run 04_19PM_25_October-2021

Degree in tangential ansätze: 2.

The system of ODEs is given by:

$$\begin{aligned}\frac{dw_1}{dt} &= -w_1w_2 - w_1w_3 + w_2w_3, \\ \frac{dw_2}{dt} &= -w_1w_2 + w_1w_3 - w_2w_3, \\ \frac{dw_3}{dt} &= w_1w_2 - w_1w_3 - w_2w_3.\end{aligned}$$

The calculated generators are:

Solving the algebraic equations

Solving equation:

$$-C_3 = 0$$

Arguments: $[-1, C_3]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_3 = 0$$

Solving equation:

$$-C_2t - C_4t - C_5 + C_7t = 0$$

Arguments: $[-C_5, C_7t, -C_2t, -C_4t]$ Arbitrary functions: \square Basis functions:[$t, 1$] Solutions:

$$C_2 = -C_4 + C_7$$

$$C_5 = 0$$

Solving equation:

$$-C_6 = 0$$

Arguments: $[-1, C_6]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_6 = 0$$

Solving equation:

$$2C_4t - 2C_7t - C_8 = 0$$

Arguments: $[-C_8, -2C_7t, 2C_4t]$ Arbitrary functions: \square Basis functions:[$2t, 1$] Solutions:

$$C_4 = C_7$$

$$C_8 = 0$$

Solving equation:

$$-2C_7t - C_9 = 0$$

Arguments: $[-C_9, -2C_7t]$ Arbitrary functions: \square Basis functions:[$-2t, 1$] Solutions:

$$C_7 = 0$$

$$C_9 = 0$$

Solving equation:

$$-C_{10} = 0$$

Arguments: $[-1, C_{10}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{10} = 0$$

Solving equation:

$$-C_{11}t^2 + C_{12}t - C_{13} + C_{21}t^2 - C_{22}t = 0$$

Arguments: $[-C_{13}, C_{12}t, C_{21}t^2, -C_{11}t^2, -C_{22}t]$ Arbitrary functions: \square Basis functions: $[-t, 1, t^2]$ Solutions:

$$\begin{aligned} C_{22} &= 0 \\ C_{11} &= C_{21} \\ C_{12} &= \frac{C_{13}}{t} \end{aligned}$$

Solving equation:

$$-C_{15} + 2C_{17}t + C_{21}t^2 - C_{31}t^2 - 2C_{32}t + C_{40} = 0$$

Arguments: $[C_{40}, -C_{15}, C_{21}t^2, -C_{31}t^2, -2C_{32}t, 2C_{17}t]$ Arbitrary functions: \square Basis functions: $[1, t, t^2]$ Solutions:

$$\begin{aligned} C_{17} &= C_{32} \\ C_{21} &= C_{31} \\ C_{15} &= C_{40} \end{aligned}$$

Solving equation:

$$C_{14}t - C_{16} - C_{34}t = 0$$

Arguments: $[-C_{16}, C_{14}t, -C_{34}t]$ Arbitrary functions: \square Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{14} &= C_{34} \\ C_{16} &= 0 \end{aligned}$$

Solving equation:

$$-C_{13} - C_{18} - C_{24}t - C_{27}t + C_{32}t + C_{34}t - C_{40} = 0$$

Arguments: $[-C_{13}, -C_{18}, -C_{40}, C_{32}t, C_{34}t, -C_{24}t, -C_{27}t]$ Arbitrary functions: \square Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{24} &= -C_{27} + C_{32} + C_{34} \\ C_{13} &= -C_{18} - C_{40} \end{aligned}$$

Solving equation:

$$-C_{18} - C_{19} - C_{37}t - 2C_{40} = 0$$

Arguments: $[-C_{18}, -C_{19}, -2C_{40}, -C_{37}t]$ Arbitrary functions: \square Basis functions: $[1, t]$ Solutions:

$$\begin{aligned} C_{37} &= 0 \\ C_{18} &= -C_{19} - 2C_{40} \end{aligned}$$

Solving equation:

$$-C_{20} + C_{27}t = 0$$

Arguments: $[-C_{20}, C_{27}t]$ Arbitrary functions: \square Basis functions: $[t, 1]$ Solutions:

$$C_{27} = 0$$

$$C_{20} = 0$$

Solving equation:

$$-C_{19} - C_{23} - C_{40} = 0$$

Arguments: $[-C_{19}, -C_{23}, -C_{40}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{19} = -C_{23} - C_{40}$$

Solving equation:

$$-C_{23} - C_{25} - 2C_{34}t - C_{40} = 0$$

Arguments: $[-C_{23}, -C_{25}, -C_{40}, -2C_{34}t]$ Arbitrary functions: \square Basis functions: $[-2t, 1]$ Solutions:

$$C_{34} = 0$$

$$C_{23} = -C_{25} - C_{40}$$

Solving equation:

$$-C_{26} = 0$$

Arguments: $[-1, C_{26}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{26} = 0$$

Solving equation:

$$-C_{28} + C_{40} = 0$$

Arguments: $[C_{40}, -C_{28}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{28} = C_{40}$$

Solving equation:

$$-C_{29} - C_{40} = 0$$

Arguments: $[-C_{29}, -C_{40}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{29} = -C_{40}$$

Solving equation:

$$-C_{30} = 0$$

Arguments: $[-1, C_{30}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{30} = 0$$

Solving equation:

$$C_{25} - C_{33} + C_{40} = 0$$

Arguments: $[C_{25}, C_{40}, -C_{33}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{25} = C_{33} - C_{40}$$

Solving equation:

$$-C_{33} - C_{35} - C_{40} = 0$$

Arguments: $[-C_{33}, -C_{35}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{33} = -C_{35} - C_{40}$$

Solving equation:

$$-C_{36} = 0$$

Arguments: $[-1, C_{36}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{36} = 0$$

Solving equation:

$$-C_{38} - C_{40} = 0$$

Arguments: $[-C_{38}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{38} = -C_{40}$$

Solving equation:

$$-C_{39} = 0$$

Arguments: $[-1, C_{39}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{39} = 0$$

$$X_1 = (1) \partial t,$$

$$X_2 = (-1 + t) \partial t + (w_1) \partial w_1 + (w_2) \partial w_2 + (w_3) \partial w_3,$$

$$X_3 = (t + 2) \partial t + (1 - 2tw_1) \partial w_1 + (1 - 2tw_2) \partial w_2 \\ + (1 - 2tw_3) \partial w_3$$

$$X_4 = (t) \partial t + (w_2 w_3 f_1(t) - w_1 w_2 f_1(t) - w_1 w_3 f_1(t)) \partial w_1 + (w_1 w_3 f_1(t) - w_1 w_2 f_1(t) \\ + -w_2 w_3 f_1(t)) \partial w_2 + (w_1 w_2 f_1(t) - w_1 w_3 f_1(t) - w_2 w_3 f_1(t)) \partial w_3$$

Some of the generators might contain the following arbitrary functions:

$$f_1$$

WARNING:

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The execution time of the script was:

0 hours 5 minutes 16 seconds.

Run 04_20PM_25_October-2021

Degree in tangential ansätze: 2.

The system of ODEs is given by:

$$\begin{aligned}\frac{dw_1}{dt} &= -w_1w_2 - w_1w_3 + w_2w_3, \\ \frac{dw_2}{dt} &= -w_1w_2 + w_1w_3 - w_2w_3, \\ \frac{dw_3}{dt} &= w_1w_2 - w_1w_3 - w_2w_3.\end{aligned}$$

The calculated generators are:

Solving the algebraic equations

Solving equation:

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Solving equation:

$$-C_2t - C_4t - C_5 + C_7t = 0$$

Arguments: $[-C_5, C_7t, -C_2t, -C_4t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$C_2 = -C_4$$

$$C_5 = C_7t$$

Solving equation:

$$-C_6 = 0$$

Arguments: $[-1, C_6]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_6 = 0$$

Solving equation:

$$2C_4t - C_7t - C_8 = 0$$

Arguments: $[-C_8, -C_7t, 2C_4t]$ Arbitrary functions: \square Basis functions:[$2t, 1$] Solutions:

$$C_4 = 0$$

$$C_7 = -\frac{C_8}{t}$$

Solving equation:

$$C_8 - C_9 = 0$$

Arguments: $[C_8, -C_9]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_8 = C_9$$

Solving equation:

$$-C_{10} = 0$$

Arguments: $[-1, C_{10}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{10} = 0$$

Solving equation:

$$-C_{11}t^2 + C_{12}t - C_{13} + C_{21}t^2 - C_{22}t = 0$$

Arguments: $[-C_{13}, C_{12}t, C_{21}t^2, -C_{11}t^2, -C_{22}t]$ Arbitrary functions: \square Basis functions:[$-t^2, t, 1$] Solutions:

$$C_{11} = 0$$

$$C_{12} = C_{22}$$

$$C_{13} = C_{21}t^2$$

Solving equation:

$$-C_{15} + 2C_{17}t - C_{31}t^2 - 2C_{32}t + C_{40} = 0$$

Arguments: $[C_{40}, -C_{15}, -C_{31}t^2, -2C_{32}t, 2C_{17}t]$ Arbitrary functions: \square Basis functions:[$-t^2, 1, t$] Solutions:

$$C_{31} = 0$$

$$C_{17} = C_{32}$$

$$C_{15} = C_{40}$$

Solving equation:

$$C_{14}t - C_{16} - C_{34}t = 0$$

Arguments: $[-C_{16}, C_{14}t, -C_{34}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_{34} &= 0 \\ C_{14} &= \frac{C_{16}}{t} \end{aligned}$$

Solving equation:

$$C_{16} - C_{18} - C_{21}t^2 - C_{24}t - C_{27}t + C_{32}t - C_{40} = 0$$

Arguments: $[C_{16}, -C_{18}, -C_{40}, C_{32}t, -C_{21}t^2, -C_{24}t, -C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[-t^2, 1, t]$ Solutions:

$$\begin{aligned} C_{21} &= 0 \\ C_{24} &= -C_{27} + C_{32} \\ C_{16} &= C_{18} + C_{40} \end{aligned}$$

Solving equation:

$$-C_{18} - C_{19} + C_{22}t - C_{37}t - 2C_{40} = 0$$

Arguments: $[-C_{18}, -C_{19}, -2C_{40}, C_{22}t, -C_{37}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_{37} &= 0 \\ C_{18} &= -C_{19} + C_{22}t - 2C_{40} \end{aligned}$$

Solving equation:

$$-C_{20} + C_{27}t = 0$$

Arguments: $[-C_{20}, C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{27} &= 0 \\ C_{20} &= 0 \end{aligned}$$

Solving equation:

$$-C_{23} = 0$$

Arguments: $[-1, C_{23}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{23} = 0$$

Solving equation:

$$C_{19} - C_{22}t - C_{25} = 0$$

Arguments: $[C_{19}, -C_{25}, -C_{22}t]$ Arbitrary functions: $[]$ Basis functions: $[1, t]$ Solutions:

$$\begin{aligned} C_{22} &= 0 \\ C_{19} &= C_{25} \end{aligned}$$

Solving equation:

$$-C_{25} - C_{26} - C_{40} = 0$$

Arguments: $[-C_{25}, -C_{26}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{25} = -C_{26} - C_{40}$$

Solving equation:

$$-C_{28} + C_{40} = 0$$

Arguments: $[C_{40}, -C_{28}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{28} = C_{40}$$

Solving equation:

$$-C_{29} - C_{40} = 0$$

Arguments: $[-C_{29}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{29} = -C_{40}$$

Solving equation:

$$-C_{30} = 0$$

Arguments: $[-1, C_{30}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{30} = 0$$

Solving equation:

$$-C_{33} = 0$$

Arguments: $[-1, C_{33}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{33} = 0$$

Solving equation:

$$C_{26} - C_{35} - C_{40} = 0$$

Arguments: $[C_{26}, -C_{35}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{26} = C_{35} + C_{40}$$

Solving equation:

$$-C_{35} - C_{36} - C_{40} = 0$$

Arguments: $[-C_{35}, -C_{36}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{35} = -C_{36} - C_{40}$$

Solving equation:

$$-C_{38} - C_{40} = 0$$

Arguments: $[-C_{38}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{38} = -C_{40}$$

Solving equation:

$$-C_{39} = 0$$

Arguments: $[-1, C_{39}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{39} = 0$$

$$X_1 = (-1 + t) \partial t + (w_1) \partial w_1 + (w_2) \partial w_2 + (w_3) \partial w_3,$$

$$X_2 = (1) \partial t,$$

$$X_3 = (-1) \partial t,$$

$$\begin{aligned} X_4 = & (t) \partial t + (w_2 w_3 f_1(t) - w_1 w_2 f_1(t) - w_1 w_3 f_1(t)) \partial w_1 + (w_1 w_3 f_1(t) - w_1 w_2 f_1(t) \\ & + -w_2 w_3 f_1(t)) \partial w_2 + (w_1 w_2 f_1(t) - w_1 w_3 f_1(t) - w_2 w_3 f_1(t)) \partial w_3 \end{aligned}$$

Some of the generators might contain the following arbitrary functions:

$$f_1$$

WARNING:

Some of the calculated generators did not satisfy the linearised symmetry conditions. Thus, the presented list here is not complete and consists exclusively of the calculated generators that satisfy the linearised symmetry conditions.

The execution time of the script was:

0 hours 5 minutes 25 seconds.

Run 04_20PM_25_October-2021

Degree in tangential ansätze: 2.

The system of ODEs is given by:

$$\begin{aligned} \frac{dw_1}{dt} &= -w_1 w_2 - w_1 w_3 + w_2 w_3, \\ \frac{dw_2}{dt} &= -w_1 w_2 + w_1 w_3 - w_2 w_3, \\ \frac{dw_3}{dt} &= w_1 w_2 - w_1 w_3 - w_2 w_3. \end{aligned}$$

The calculated generators are:

Solving the algebraic equations

Solving equation:

$$-C_3 = 0$$

Arguments: $[-1, C_3]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_3 = 0$$

Solving equation:

$$-C_2t - C_4t - C_5 + C_7t = 0$$

Arguments: $[-C_5, C_7t, -C_2t, -C_4t]$ Arbitrary functions: \square Basis functions:[$-t, 1$] Solutions:

$$C_2 = -C_4$$

$$C_5 = C_7t$$

Solving equation:

$$-C_6 = 0$$

Arguments: $[-1, C_6]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_6 = 0$$

Solving equation:

$$2C_4t - C_7t - C_8 = 0$$

Arguments: $[-C_8, -C_7t, 2C_4t]$ Arbitrary functions: \square Basis functions:[$-t, 1$] Solutions:

$$C_7 = 0$$

$$C_4 = \frac{C_8}{2t}$$

Solving equation:

$$-C_8 - C_9 = 0$$

Arguments: $[-C_8, -C_9]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_8 = -C_9$$

Solving equation:

$$-C_{10} = 0$$

Arguments: $[-1, C_{10}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{10} = 0$$

Solving equation:

$$-C_{11}t^2 + C_{12}t - C_{13} + C_{21}t^2 - C_{22}t = 0$$

Arguments: $[-C_{13}, C_{12}t, C_{21}t^2, -C_{11}t^2, -C_{22}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, t^2, 1]$ Solutions:

$$\begin{aligned} C_{22} &= 0 \\ C_{11} &= C_{21} \\ C_{12} &= \frac{C_{13}}{t} \end{aligned}$$

Solving equation:

$$-C_{15} + 2C_{17}t + C_{21}t^2 - C_{31}t^2 - 2C_{32}t + C_{40} = 0$$

Arguments: $[C_{40}, -C_{15}, C_{21}t^2, -C_{31}t^2, -2C_{32}t, 2C_{17}t]$ Arbitrary functions: $[]$ Basis functions: $[1, t, t^2]$ Solutions:

$$\begin{aligned} C_{17} &= C_{32} \\ C_{21} &= C_{31} \\ C_{15} &= C_{40} \end{aligned}$$

Solving equation:

$$C_{14}t - C_{16} - C_{34}t = 0$$

Arguments: $[-C_{16}, C_{14}t, -C_{34}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_{34} &= 0 \\ C_{14} &= \frac{C_{16}}{t} \end{aligned}$$

Solving equation:

$$-C_{13} + C_{16} - C_{18} - C_{24}t - C_{27}t + C_{32}t - C_{40} = 0$$

Arguments: $[C_{16}, -C_{13}, -C_{18}, -C_{40}, C_{32}t, -C_{24}t, -C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[1, t]$ Solutions:

$$\begin{aligned} C_{24} &= -C_{27} + C_{32} \\ C_{13} &= C_{16} - C_{18} - C_{40} \end{aligned}$$

Solving equation:

$$-C_{18} - C_{19} - C_{37}t - 2C_{40} = 0$$

Arguments: $[-C_{18}, -C_{19}, -2C_{40}, -C_{37}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_{37} &= 0 \\ C_{18} &= -C_{19} - 2C_{40} \end{aligned}$$

Solving equation:

$$-C_{20} + C_{27}t = 0$$

Arguments: $[-C_{20}, C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[1, t]$ Solutions:

$$\begin{aligned} C_{27} &= 0 \\ C_{20} &= 0 \end{aligned}$$

Solving equation:

$$-C_{16} - C_{19} - C_{23} - C_{40} = 0$$

Arguments: $[-C_{16}, -C_{19}, -C_{23}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{16} = -C_{19} - C_{23} - C_{40}$$

Solving equation:

$$C_{19} - C_{25} = 0$$

Arguments: $[C_{19}, -C_{25}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{19} = C_{25}$$

Solving equation:

$$-C_{23} - C_{25} - C_{26} - C_{40} = 0$$

Arguments: $[-C_{23}, -C_{25}, -C_{26}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{23} = -C_{25} - C_{26} - C_{40}$$

Solving equation:

$$-C_{28} + C_{40} = 0$$

Arguments: $[C_{40}, -C_{28}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{28} = C_{40}$$

Solving equation:

$$-C_{29} - C_{40} = 0$$

Arguments: $[-C_{29}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{29} = -C_{40}$$

Solving equation:

$$-C_{30} = 0$$

Arguments: $[-1, C_{30}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{30} = 0$$

Solving equation:

$$C_{25} + C_{26} - C_{33} + C_{40} = 0$$

Arguments: $[C_{25}, C_{26}, C_{40}, -C_{33}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{25} = -C_{26} + C_{33} - C_{40}$$

Solving equation:

$$C_{26} - C_{33} - C_{35} - C_{40} = 0$$

Arguments: $[C_{26}, -C_{33}, -C_{35}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{26} = C_{33} + C_{35} + C_{40}$$

Solving equation:

$$-C_{33} - C_{35} - C_{36} - C_{40} = 0$$

Arguments: $[-C_{33}, -C_{35}, -C_{36}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{33} = -C_{35} - C_{36} - C_{40}$$

Solving equation:

$$-C_{38} - C_{40} = 0$$

Arguments: $[-C_{38}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{38} = -C_{40}$$

Solving equation:

$$-C_{39} = 0$$

Arguments: $[-1, C_{39}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{39} = 0$$

$$X_1 = (1) \partial t,$$

$$X_2 = (t + 2) \partial t + (1 - 2tw_1) \partial w_1 + (1 - 2tw_2) \partial w_2 \\ + (1 - 2tw_3) \partial w_3$$

$$X_3 = (-1 + t) \partial t + (w_1) \partial w_1 + (w_2) \partial w_2 + (w_3) \partial w_3,$$

$$X_4 = (t) \partial t + (w_2 w_3 f_1(t) - w_1 w_2 f_1(t) - w_1 w_3 f_1(t)) \partial w_1 + (w_1 w_3 f_1(t) - w_1 w_2 f_1(t) \\ + -w_2 w_3 f_1(t)) \partial w_2 + (w_1 w_2 f_1(t) - w_1 w_3 f_1(t) - w_2 w_3 f_1(t)) \partial w_3$$

Some of the generators might contain the following arbitrary functions:

$$f_1$$

WARNING:

Some of the calculated generators did not satisfy the linearised symmetry conditions. Thus, the presented list here is not complete and consists exclusively of the calculated generators that satisfy the linearised symmetry conditions.

The execution time of the script was:

0 hours 5 minutes 28 seconds.

Run 04_24PM_25_October-2021

Degree in tangential ansätze: 2.

The system of ODEs is given by:

$$\begin{aligned}\frac{dw_1}{dt} &= -w_1w_2 - w_1w_3 + w_2w_3, \\ \frac{dw_2}{dt} &= -w_1w_2 + w_1w_3 - w_2w_3, \\ \frac{dw_3}{dt} &= w_1w_2 - w_1w_3 - w_2w_3.\end{aligned}$$

The calculated generators are:

Solving the algebraic equations

Solving equation:

$$-C_3 = 0$$

Arguments: $[-1, C_3]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_3 = 0$$

Solving equation:

$$-C_2t - C_4t - C_5 + C_7t = 0$$

Arguments: $[-C_5, C_7t, -C_2t, -C_4t]$ Arbitrary functions: \square Basis functions:[$-t, 1$] Solutions:

$$C_2 = -C_4$$

$$C_5 = C_7t$$

Solving equation:

$$-C_6 = 0$$

Arguments: $[-1, C_6]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_6 = 0$$

Solving equation:

$$2C_4t - C_7t - C_8 = 0$$

Arguments: $[-C_8, -C_7t, 2C_4t]$ Arbitrary functions: \square Basis functions:[$-t, 1$] Solutions:

$$C_7 = 0$$

$$C_4 = \frac{C_8}{2t}$$

Solving equation:

$$-C_8 - C_9 = 0$$

Arguments: $[-C_8, -C_9]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_8 = -C_9$$

Solving equation:

$$-C_{10} = 0$$

Arguments: $[-1, C_{10}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{10} = 0$$

Solving equation:

$$-C_{11}t^2 + C_{12}t - C_{13} + C_{21}t^2 - C_{22}t = 0$$

Arguments: $[-C_{13}, C_{12}t, C_{21}t^2, -C_{11}t^2, -C_{22}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1, t^2]$ Solutions:

$$C_{22} = 0$$

$$C_{11} = C_{21}$$

$$C_{12} = \frac{C_{13}}{t}$$

Solving equation:

$$-C_{15} + 2C_{17}t + C_{21}t^2 - C_{31}t^2 - 2C_{32}t + C_{40} = 0$$

Arguments: $[C_{40}, -C_{15}, C_{21}t^2, -C_{31}t^2, -2C_{32}t, 2C_{17}t]$ Arbitrary functions: $[]$ Basis functions: $[1, t, t^2]$ Solutions:

$$C_{17} = C_{32}$$

$$C_{21} = C_{31}$$

$$C_{15} = C_{40}$$

Solving equation:

$$C_{14}t - C_{16} - C_{34}t = 0$$

Arguments: $[-C_{16}, C_{14}t, -C_{34}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$C_{34} = 0$$

$$C_{14} = \frac{C_{16}}{t}$$

Solving equation:

$$-C_{13} + C_{16} - C_{18} - C_{24}t - C_{27}t + C_{32}t - C_{40} = 0$$

Arguments: $[C_{16}, -C_{13}, -C_{18}, -C_{40}, C_{32}t, -C_{24}t, -C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[1, t]$ Solutions:

$$C_{24} = -C_{27} + C_{32}$$

$$C_{13} = C_{16} - C_{18} - C_{40}$$

Solving equation:

$$-C_{18} - C_{19} - C_{37}t - 2C_{40} = 0$$

Arguments: $[-C_{18}, -C_{19}, -2C_{40}, -C_{37}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_{37} &= 0 \\ C_{18} &= -C_{19} - 2C_{40} \end{aligned}$$

Solving equation:

$$-C_{20} + C_{27}t = 0$$

Arguments: $[-C_{20}, C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[1, t]$ Solutions:

$$\begin{aligned} C_{27} &= 0 \\ C_{20} &= 0 \end{aligned}$$

Solving equation:

$$-C_{16} - C_{19} - C_{23} - C_{40} = 0$$

Arguments: $[-C_{16}, -C_{19}, -C_{23}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{16} = -C_{19} - C_{23} - C_{40}$$

Solving equation:

$$C_{19} - C_{25} = 0$$

Arguments: $[C_{19}, -C_{25}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{19} = C_{25}$$

Solving equation:

$$-C_{23} - C_{25} - C_{26} - C_{40} = 0$$

Arguments: $[-C_{23}, -C_{25}, -C_{26}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{23} = -C_{25} - C_{26} - C_{40}$$

Solving equation:

$$-C_{28} + C_{40} = 0$$

Arguments: $[C_{40}, -C_{28}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{28} = C_{40}$$

Solving equation:

$$-C_{29} - C_{40} = 0$$

Arguments: $[-C_{29}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{29} = -C_{40}$$

Solving equation:

$$-C_{30} = 0$$

Arguments: $[-1, C_{30}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{30} = 0$$

Solving equation:

$$C_{25} + C_{26} - C_{33} + C_{40} = 0$$

Arguments: $[C_{25}, C_{26}, C_{40}, -C_{33}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{25} = -C_{26} + C_{33} - C_{40}$$

Solving equation:

$$C_{26} - C_{33} - C_{35} - C_{40} = 0$$

Arguments: $[C_{26}, -C_{33}, -C_{35}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{26} = C_{33} + C_{35} + C_{40}$$

Solving equation:

$$-C_{33} - C_{35} - C_{36} - C_{40} = 0$$

Arguments: $[-C_{33}, -C_{35}, -C_{36}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{33} = -C_{35} - C_{36} - C_{40}$$

Solving equation:

$$-C_{38} - C_{40} = 0$$

Arguments: $[-C_{38}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{38} = -C_{40}$$

Solving equation:

$$-C_{39} = 0$$

Arguments: $[-1, C_{39}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{39} = 0$$

$$X_1 = (1) \partial t,$$

$$X_2 = (-1 + t) \partial t + (w_1) \partial w_1 + (w_2) \partial w_2 + (w_3) \partial w_3,$$

$$X_3 = (t + 2) \partial t + (1 - 2tw_1) \partial w_1 + (1 - 2tw_2) \partial w_2 \\ + (1 - 2tw_3) \partial w_3$$

$$X_4 = (t) \partial t + (w_2 w_3 f_1(t) - w_1 w_2 f_1(t) - w_1 w_3 f_1(t)) \partial w_1 + (w_1 w_3 f_1(t) - w_1 w_2 f_1(t) \\ + -w_2 w_3 f_1(t)) \partial w_2 + (w_1 w_2 f_1(t) - w_1 w_3 f_1(t) - w_2 w_3 f_1(t)) \partial w_3$$

Some of the generators might contain the following arbitrary functions:

$$f_1$$

WARNING:

Some of the calculated generators did not satisfy the linearised symmetry conditions. Thus, the presented list here is not complete and consists exclusively of the calculated generators that satisfy the linearised symmetry conditions.

The execution time of the script was:

0 hours 5 minutes 30 seconds.

Run 04_25PM_25_October-2021

Degree in tangential ansätze: 2.

The system of ODEs is given by:

$$\frac{dw_1}{dt} = -w_1 w_2 - w_1 w_3 + w_2 w_3, \\ \frac{dw_2}{dt} = -w_1 w_2 + w_1 w_3 - w_2 w_3, \\ \frac{dw_3}{dt} = w_1 w_2 - w_1 w_3 - w_2 w_3.$$

The calculated generators are:

Solving the algebraic equations

Solving equation:

$$-C_3 = 0$$

Arguments: $[-1, C_3]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_3 = 0$$

Solving equation:

$$-C_2 t - C_4 t - C_5 + C_7 t = 0$$

Arguments: $[-C_5, C_7t, -C_2t, -C_4t]$ Arbitrary functions: \square Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_2 &= -C_4 + C_7 \\ C_5 &= 0 \end{aligned}$$

Solving equation:

$$-C_6 = 0$$

Arguments: $[-1, C_6]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_6 = 0$$

Solving equation:

$$2C_4t - 2C_7t - C_8 = 0$$

Arguments: $[-C_8, -2C_7t, 2C_4t]$ Arbitrary functions: \square Basis functions: $[-2t, 1]$ Solutions:

$$\begin{aligned} C_7 &= 0 \\ C_4 &= \frac{C_8}{2t} \end{aligned}$$

Solving equation:

$$-C_8 - C_9 = 0$$

Arguments: $[-C_8, -C_9]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_8 = -C_9$$

Solving equation:

$$-C_{10} = 0$$

Arguments: $[-1, C_{10}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{10} = 0$$

Solving equation:

$$-C_{11}t^2 + C_{12}t - C_{13} + C_{21}t^2 - C_{22}t = 0$$

Arguments: $[-C_{13}, C_{12}t, C_{21}t^2, -C_{11}t^2, -C_{22}t]$ Arbitrary functions: \square Basis functions: $[t, t^2, 1]$ Solutions:

$$\begin{aligned} C_{12} &= C_{22} \\ C_{11} &= C_{21} \\ C_{13} &= 0 \end{aligned}$$

Solving equation:

$$-C_{15} + 2C_{17}t + C_{21}t^2 - C_{31}t^2 - 2C_{32}t + C_{40} = 0$$

Arguments: $[C_{40}, -C_{15}, C_{21}t^2, -C_{31}t^2, -2C_{32}t, 2C_{17}t]$ Arbitrary functions: \square Basis functions: $[1, t^2, t]$ Solutions:

$$\begin{aligned} C_{21} &= C_{31} \\ C_{17} &= C_{32} \\ C_{15} &= C_{40} \end{aligned}$$

Solving equation:

$$C_{14}t - C_{16} - C_{34}t = 0$$

Arguments: $[-C_{16}, C_{14}t, -C_{34}t]$ Arbitrary functions: \square Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{14} &= C_{34} \\ C_{16} &= 0 \end{aligned}$$

Solving equation:

$$-C_{18} - C_{24}t - C_{27}t + C_{32}t + C_{34}t - C_{40} = 0$$

Arguments: $[-C_{18}, -C_{40}, C_{32}t, C_{34}t, -C_{24}t, -C_{27}t]$ Arbitrary functions: \square Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{24} &= -C_{27} + C_{32} + C_{34} \\ C_{18} &= -C_{40} \end{aligned}$$

Solving equation:

$$-C_{19} + C_{22}t - C_{37}t - C_{40} = 0$$

Arguments: $[-C_{19}, -C_{40}, C_{22}t, -C_{37}t]$ Arbitrary functions: \square Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{22} &= C_{37} \\ C_{19} &= -C_{40} \end{aligned}$$

Solving equation:

$$-C_{20} + C_{27}t + C_{37}t = 0$$

Arguments: $[-C_{20}, C_{27}t, C_{37}t]$ Arbitrary functions: \square Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{27} &= -C_{37} \\ C_{20} &= 0 \end{aligned}$$

Solving equation:

$$-C_{23} = 0$$

Arguments: $[-1, C_{23}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{23} = 0$$

Solving equation:

$$-C_{25} - 2C_{34}t - 2C_{37}t - C_{40} = 0$$

Arguments: $[-C_{25}, -C_{40}, -2C_{34}t, -2C_{37}t]$ Arbitrary functions: \square Basis functions: $[-2t, 1]$ Solutions:

$$\begin{aligned} C_{34} &= -C_{37} \\ C_{25} &= -C_{40} \end{aligned}$$

Solving equation:

$$-C_{26} - 2C_{37}t = 0$$

Arguments: $[-C_{26}, -2C_{37}t]$ Arbitrary functions: \square Basis functions: $[-2t, 1]$ Solutions:

$$C_{37} = 0$$

$$C_{26} = 0$$

Solving equation:

$$-C_{28} + C_{40} = 0$$

Arguments: $[C_{40}, -C_{28}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{28} = C_{40}$$

Solving equation:

$$-C_{29} - C_{40} = 0$$

Arguments: $[-C_{29}, -C_{40}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{29} = -C_{40}$$

Solving equation:

$$-C_{30} = 0$$

Arguments: $[-1, C_{30}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{30} = 0$$

Solving equation:

$$-C_{33} = 0$$

Arguments: $[-1, C_{33}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{33} = 0$$

Solving equation:

$$-C_{35} - C_{40} = 0$$

Arguments: $[-C_{35}, -C_{40}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{35} = -C_{40}$$

Solving equation:

$$-C_{36} = 0$$

Arguments: $[-1, C_{36}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{36} = 0$$

Solving equation:

$$-C_{38} - C_{40} = 0$$

Arguments: $[-C_{38}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{38} = -C_{40}$$

Solving equation:

$$-C_{39} = 0$$

Arguments: $[-1, C_{39}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{39} = 0$$

$$X_1 = (-1 + t) \partial t + (w_1) \partial w_1 + (w_2) \partial w_2 + (w_3) \partial w_3,$$

$$X_2 = (-1) \partial t,$$

$$X_3 = (t + 2) \partial t + (1 - 2tw_1) \partial w_1 + (1 - 2tw_2) \partial w_2 \\ + (1 - 2tw_3) \partial w_3$$

$$X_4 = (1) \partial t,$$

$$X_5 = (t) \partial t + (w_2 w_3 f_1(t) - w_1 w_2 f_1(t) - w_1 w_3 f_1(t)) \partial w_1 + (w_1 w_3 f_1(t) - w_1 w_2 f_1(t) \\ + -w_2 w_3 f_1(t)) \partial w_2 + (w_1 w_2 f_1(t) - w_1 w_3 f_1(t) - w_2 w_3 f_1(t)) \partial w_3$$

Some of the generators might contain the following arbitrary functions:

$$f_1$$

WARNING:

Some of the calculated generators did not satisfy the linearised symmetry conditions. Thus, the presented list here is not complete and consists exclusively of the calculated generators that satisfy the linearised symmetry conditions.

The execution time of the script was:

0 hours 5 minutes 10 seconds.

Run 04_29PM_25_October-2021

Degree in tangential ansätze: 2.

The system of ODEs is given by:

$$\begin{aligned}\frac{dw_1}{dt} &= -w_1w_2 - w_1w_3 + w_2w_3, \\ \frac{dw_2}{dt} &= -w_1w_2 + w_1w_3 - w_2w_3, \\ \frac{dw_3}{dt} &= w_1w_2 - w_1w_3 - w_2w_3.\end{aligned}$$

The calculated generators are:

Solving the algebraic equations

Solving equation:

$$-C_3 = 0$$

Arguments: $[-1, C_3]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_3 = 0$$

Solving equation:

$$-C_2t - C_4t - C_5 + C_7t = 0$$

Arguments: $[-C_5, C_7t, -C_2t, -C_4t]$ Arbitrary functions: \square Basis functions:[$t, 1$] Solutions:

$$C_2 = -C_4 + C_7$$

$$C_5 = 0$$

Solving equation:

$$-C_6 = 0$$

Arguments: $[-1, C_6]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_6 = 0$$

Solving equation:

$$2C_4t - 2C_7t - C_8 = 0$$

Arguments: $[-C_8, -2C_7t, 2C_4t]$ Arbitrary functions: \square Basis functions:[$2t, 1$] Solutions:

$$C_4 = C_7$$

$$C_8 = 0$$

Solving equation:

$$-2C_7t - C_9 = 0$$

Arguments: $[-C_9, -2C_7t]$ Arbitrary functions: \square Basis functions:[$-2t, 1$] Solutions:

$$C_7 = 0$$

$$C_9 = 0$$

Solving equation:

$$-C_{10} = 0$$

Arguments: $[-1, C_{10}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{10} = 0$$

Solving equation:

$$-C_{11}t^2 + C_{12}t - C_{13} + C_{21}t^2 - C_{22}t = 0$$

Arguments: $[-C_{13}, C_{12}t, C_{21}t^2, -C_{11}t^2, -C_{22}t]$ Arbitrary functions: \square Basis functions: $[-t, t^2, 1]$ Solutions:

$$\begin{aligned} C_{22} &= 0 \\ C_{11} &= C_{21} \\ C_{12} &= \frac{C_{13}}{t} \end{aligned}$$

Solving equation:

$$-C_{15} + 2C_{17}t + C_{21}t^2 - C_{31}t^2 - 2C_{32}t + C_{40} = 0$$

Arguments: $[C_{40}, -C_{15}, C_{21}t^2, -C_{31}t^2, -2C_{32}t, 2C_{17}t]$ Arbitrary functions: \square Basis functions: $[1, t, t^2]$ Solutions:

$$\begin{aligned} C_{17} &= C_{32} \\ C_{21} &= C_{31} \\ C_{15} &= C_{40} \end{aligned}$$

Solving equation:

$$C_{14}t - C_{16} - C_{34}t = 0$$

Arguments: $[-C_{16}, C_{14}t, -C_{34}t]$ Arbitrary functions: \square Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{14} &= C_{34} \\ C_{16} &= 0 \end{aligned}$$

Solving equation:

$$-C_{13} - C_{18} - C_{24}t - C_{27}t + C_{32}t + C_{34}t - C_{40} = 0$$

Arguments: $[-C_{13}, -C_{18}, -C_{40}, C_{32}t, C_{34}t, -C_{24}t, -C_{27}t]$ Arbitrary functions: \square Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{24} &= -C_{27} + C_{32} + C_{34} \\ C_{13} &= -C_{18} - C_{40} \end{aligned}$$

Solving equation:

$$-C_{18} - C_{19} - C_{37}t - 2C_{40} = 0$$

Arguments: $[-C_{18}, -C_{19}, -2C_{40}, -C_{37}t]$ Arbitrary functions: \square Basis functions: $[1, t]$ Solutions:

$$\begin{aligned} C_{37} &= 0 \\ C_{18} &= -C_{19} - 2C_{40} \end{aligned}$$

Solving equation:

$$-C_{20} + C_{27}t = 0$$

Arguments: $[-C_{20}, C_{27}t]$ Arbitrary functions: \square Basis functions: $[t, 1]$ Solutions:

$$\begin{aligned} C_{27} &= 0 \\ C_{20} &= 0 \end{aligned}$$

Solving equation:

$$-C_{19} - C_{23} - C_{40} = 0$$

Arguments: $[-C_{19}, -C_{23}, -C_{40}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{19} = -C_{23} - C_{40}$$

Solving equation:

$$-C_{23} - C_{25} - 2C_{34}t - C_{40} = 0$$

Arguments: $[-C_{23}, -C_{25}, -C_{40}, -2C_{34}t]$ Arbitrary functions: \square Basis functions: $[-2t, 1]$ Solutions:

$$\begin{aligned} C_{34} &= 0 \\ C_{23} &= -C_{25} - C_{40} \end{aligned}$$

Solving equation:

$$-C_{26} = 0$$

Arguments: $[-1, C_{26}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{26} = 0$$

Solving equation:

$$-C_{28} + C_{40} = 0$$

Arguments: $[C_{40}, -C_{28}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{28} = C_{40}$$

Solving equation:

$$-C_{29} - C_{40} = 0$$

Arguments: $[-C_{29}, -C_{40}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{29} = -C_{40}$$

Solving equation:

$$-C_{30} = 0$$

Arguments: $[-1, C_{30}]$ Arbitrary functions: \square Basis functions: $[1]$ Solutions:

$$C_{30} = 0$$

Solving equation:

$$C_{25} - C_{33} + C_{40} = 0$$

Arguments: $[C_{25}, C_{40}, -C_{33}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{25} = C_{33} - C_{40}$$

Solving equation:

$$-C_{33} - C_{35} - C_{40} = 0$$

Arguments: $[-C_{33}, -C_{35}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{33} = -C_{35} - C_{40}$$

Solving equation:

$$-C_{36} = 0$$

Arguments: $[-1, C_{36}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{36} = 0$$

Solving equation:

$$-C_{38} - C_{40} = 0$$

Arguments: $[-C_{38}, -C_{40}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{38} = -C_{40}$$

Solving equation:

$$-C_{39} = 0$$

Arguments: $[-1, C_{39}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{39} = 0$$

$$X_1 = (1) \partial t,$$

$$X_2 = (t + 2) \partial t + (1 - 2tw_1) \partial w_1 + (1 - 2tw_2) \partial w_2 \\ + (1 - 2tw_3) \partial w_3$$

$$X_3 = (-1 + t) \partial t + (w_1) \partial w_1 + (w_2) \partial w_2 + (w_3) \partial w_3,$$

$$X_4 = (t) \partial t + (w_2 w_3 f_1(t) - w_1 w_2 f_1(t) - w_1 w_3 f_1(t)) \partial w_1 + (w_1 w_3 f_1(t) - w_1 w_2 f_1(t) \\ + -w_2 w_3 f_1(t)) \partial w_2 + (w_1 w_2 f_1(t) - w_1 w_3 f_1(t) - w_2 w_3 f_1(t)) \partial w_3$$

Some of the generators might contain the following arbitrary functions:

$$f_1$$

WARNING:

Some of the calculated generators did not satisfy the linearised symmetry conditions. Thus, the presented list here is not complete and consists exclusively of the calculated generators that satisfy the linearised symmetry conditions.

The execution time of the script was:

0 hours 5 minutes 16 seconds.

Run 04_31PM_25_October-2021

Degree in tangential ansätze: 2.

The system of ODEs is given by:

$$\begin{aligned}\frac{dw_1}{dt} &= -w_1w_2 - w_1w_3 + w_2w_3, \\ \frac{dw_2}{dt} &= -w_1w_2 + w_1w_3 - w_2w_3, \\ \frac{dw_3}{dt} &= w_1w_2 - w_1w_3 - w_2w_3.\end{aligned}$$

The calculated generators are:

Solving the algebraic equations

Solving equation:

$$-C_3 = 0$$

Arguments: $[-1, C_3]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_3 = 0$$

Solving equation:

$$-C_2t - C_4t - C_5 + C_7t = 0$$

Arguments: $[-C_5, C_7t, -C_2t, -C_4t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$C_2 = -C_4$$

$$C_5 = C_7t$$

Solving equation:

$$-C_6 = 0$$

Arguments: $[-1, C_6]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_6 = 0$$

Solving equation:

$$2C_4t - C_7t - C_8 = 0$$

Arguments: $[-C_8, -C_7t, 2C_4t]$ Arbitrary functions: \square Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_7 &= 0 \\ C_4 &= \frac{C_8}{2t} \end{aligned}$$

Solving equation:

$$-C_8 - C_9 = 0$$

Arguments: $[-C_8, -C_9]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_8 = -C_9$$

Solving equation:

$$-C_{10} = 0$$

Arguments: $[-1, C_{10}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{10} = 0$$

Solving equation:

$$-C_{11}t^2 + C_{12}t - C_{13} + C_{21}t^2 - C_{22}t = 0$$

Arguments: $[-C_{13}, C_{12}t, C_{21}t^2, -C_{11}t^2, -C_{22}t]$ Arbitrary functions: \square Basis functions: $[-t, t^2, 1]$ Solutions:

$$\begin{aligned} C_{22} &= 0 \\ C_{11} &= C_{21} \\ C_{12} &= \frac{C_{13}}{t} \end{aligned}$$

Solving equation:

$$-C_{15} + 2C_{17}t + C_{21}t^2 - C_{31}t^2 - 2C_{32}t + C_{40} = 0$$

Arguments: $[C_{40}, -C_{15}, C_{21}t^2, -C_{31}t^2, -2C_{32}t, 2C_{17}t]$ Arbitrary functions: \square Basis functions: $[-2t, 1, t^2]$ Solutions:

$$\begin{aligned} C_{32} &= 0 \\ C_{21} &= C_{31} \\ C_{15} &= 2C_{17}t + C_{40} \end{aligned}$$

Solving equation:

$$C_{14}t - C_{16} - C_{34}t = 0$$

Arguments: $[-C_{16}, C_{14}t, -C_{34}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_{34} &= 0 \\ C_{14} &= \frac{C_{16}}{t} \end{aligned}$$

Solving equation:

$$-C_{13} + C_{16} - C_{17}t - C_{18} - C_{24}t - C_{27}t - C_{40} = 0$$

Arguments: $[C_{16}, -C_{13}, -C_{18}, -C_{40}, -C_{17}t, -C_{24}t, -C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_{17} &= -C_{24} - C_{27} \\ C_{13} &= C_{16} - C_{18} - C_{40} \end{aligned}$$

Solving equation:

$$-C_{18} - C_{19} + C_{24}t + C_{27}t - C_{37}t - 2C_{40} = 0$$

Arguments: $[-C_{18}, -C_{19}, -2C_{40}, C_{24}t, C_{27}t, -C_{37}t]$ Arbitrary functions: $[]$ Basis functions: $[-t, 1]$ Solutions:

$$\begin{aligned} C_{37} &= 0 \\ C_{18} &= -C_{19} + C_{24}t + C_{27}t - 2C_{40} \end{aligned}$$

Solving equation:

$$-C_{20} + C_{27}t = 0$$

Arguments: $[-C_{20}, C_{27}t]$ Arbitrary functions: $[]$ Basis functions: $[1, t]$ Solutions:

$$\begin{aligned} C_{27} &= 0 \\ C_{20} &= 0 \end{aligned}$$

Solving equation:

$$-C_{16} - C_{19} - C_{23} + C_{24}t - C_{40} = 0$$

Arguments: $[-C_{16}, -C_{19}, -C_{23}, -C_{40}, C_{24}t]$ Arbitrary functions: $[]$ Basis functions: $[1, t]$ Solutions:

$$\begin{aligned} C_{24} &= 0 \\ C_{16} &= -C_{19} - C_{23} - C_{40} \end{aligned}$$

Solving equation:

$$C_{19} - C_{25} = 0$$

Arguments: $[C_{19}, -C_{25}]$ Arbitrary functions: $[]$ Basis functions: $[1]$ Solutions:

$$C_{19} = C_{25}$$

Solving equation:

$$-C_{23} - C_{25} - C_{26} - C_{40} = 0$$

Arguments: $[-C_{23}, -C_{25}, -C_{26}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{23} = -C_{25} - C_{26} - C_{40}$$

Solving equation:

$$-C_{28} + C_{40} = 0$$

Arguments: $[C_{40}, -C_{28}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{28} = C_{40}$$

Solving equation:

$$-C_{29} - C_{40} = 0$$

Arguments: $[-C_{29}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{29} = -C_{40}$$

Solving equation:

$$-C_{30} = 0$$

Arguments: $[-1, C_{30}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{30} = 0$$

Solving equation:

$$C_{25} + C_{26} - C_{33} + C_{40} = 0$$

Arguments: $[C_{25}, C_{26}, C_{40}, -C_{33}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{25} = -C_{26} + C_{33} - C_{40}$$

Solving equation:

$$C_{26} - C_{33} - C_{35} - C_{40} = 0$$

Arguments: $[C_{26}, -C_{33}, -C_{35}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{26} = C_{33} + C_{35} + C_{40}$$

Solving equation:

$$-C_{33} - C_{35} - C_{36} - C_{40} = 0$$

Arguments: $[-C_{33}, -C_{35}, -C_{36}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{33} = -C_{35} - C_{36} - C_{40}$$

Solving equation:

$$-C_{38} - C_{40} = 0$$

Arguments: $[-C_{38}, -C_{40}]$ Arbitrary functions: \square Basis functions:[1] Solutions:

$$C_{38} = -C_{40}$$

Solving equation:

$$-C_{39} = 0$$

Arguments: $[-1, C_{39}]$ Arbitrary functions: $[]$ Basis functions:[1] Solutions:

$$C_{39} = 0$$

$$X_1 = (t + 2) \partial t + (1 - 2tw_1) \partial w_1 + (1 - 2tw_2) \partial w_2 \\ + (1 - 2tw_3) \partial w_3$$

$$X_2 = (1) \partial t,$$

$$X_3 = (t) \partial t + (w_2 w_3 f_1(t) - w_1 w_2 f_1(t) - w_1 w_3 f_1(t)) \partial w_1 + (w_1 w_3 f_1(t) - w_1 w_2 f_1(t) \\ + -w_2 w_3 f_1(t)) \partial w_2 + (w_1 w_2 f_1(t) - w_1 w_3 f_1(t) - w_2 w_3 f_1(t)) \partial w_3$$

Some of the generators might contain the following arbitrary functions:

$$f_1$$

WARNING:

Some of the calculated generators did not satisfy the linearised symmetry conditions. Thus, the presented list here is not complete and consists exclusively of the calculated generators that satisfy the linearised symmetry conditions.

The execution time of the script was:

0 hours 5 minutes 15 seconds.