Summary of symmetry calculations

June 25, 2021

Contents

Chapter 1

DBH_model

Run 11_00AM_25_June-2021

Degree in tangential ansätze: 1
The system of ODEs is given by:

$$\begin{aligned}
\frac{\mathrm{d}w_1}{\mathrm{d}t} &= -w_1w_2 - w_1w_3 + w_2w_3,\\
\frac{\mathrm{d}w_2}{\mathrm{d}t} &= -w_1w_2 + w_1w_3 - w_2w_3,\\
\frac{\mathrm{d}w_3}{\mathrm{d}t} &= w_1w_2 - w_1w_3 - w_2w_3.
\end{aligned}$$

The calculated generators are:

$$\begin{aligned}
X_1 &= (1)\,\partial t,\\
X_2 &= \left(\frac{t^2}{2}\right)\partial t + (1)\,\partial w_1,\\
X_3 &= \left(\frac{t^2}{2}\right)\partial t + (1)\,\partial w_2,\\
X_4 &= (1)\,\partial w_3,\\
X_5 &= (-t)\,\partial t
\end{aligned}$$

Run 11_02AM_25_June-2021

Degree in tangential ansätze: 1
The system of ODEs is given by:

$$\begin{aligned}
\frac{\mathrm{d}w_1}{\mathrm{d}t} &= -w_1w_2 - w_1w_3 + w_2w_3,\\
\frac{\mathrm{d}w_2}{\mathrm{d}t} &= -w_1w_2 + w_1w_3 - w_2w_3,\\
\frac{\mathrm{d}w_3}{\mathrm{d}t} &= w_1w_2 - w_1w_3 - w_2w_3.
\end{aligned}$$

The calculated generators are:

$$
\begin{aligned}
X_1 &= (1)\,\partial t,\\
X_2 &= \left(\frac{t^2}{2}\right)\partial t + (1)\,\partial w_1,\\
X_3 &= \left(\frac{t^2}{2}\right)\partial t + (1)\,\partial w_2,\\
X_4 &= (1)\,\partial w_3,\\
X_5 &= (-t)\,\partial t
\end{aligned}
$$

Run 11_04AM_25_June-2021

Degree in tangential ansätze: 1
The system of ODEs is given by:

$$
\begin{aligned}
\frac{\mathrm{d}w_1}{\mathrm{d}t} &= -w_1w_2 - w_1w_3 + w_2w_3,\\
\frac{\mathrm{d}w_2}{\mathrm{d}t} &= -w_1w_2 + w_1w_3 - w_2w_3,\\
\frac{\mathrm{d}w_3}{\mathrm{d}t} &= w_1w_2 - w_1w_3 - w_2w_3.
\end{aligned}
$$

The calculated generators are:

$$
\begin{aligned}
X_1 &= (1)\,\partial t,\\
X_2 &= \left(\frac{t^2}{2}\right)\partial t + (1)\,\partial w_1,\\
X_3 &= \left(\frac{t^2}{2}\right)\partial t + (1)\,\partial w_2,\\
X_4 &= (1)\,\partial w_3,\\
X_5 &= (-t)\,\partial t
\end{aligned}
$$

Run 11_06AM_25_June-2021

Degree in tangential ansätze: 1
The system of ODEs is given by:

$$
\begin{aligned}
\frac{\mathrm{d}w_1}{\mathrm{d}t} &= -w_1w_2 - w_1w_3 + w_2w_3,\\
\frac{\mathrm{d}w_2}{\mathrm{d}t} &= -w_1w_2 + w_1w_3 - w_2w_3,\\
\frac{\mathrm{d}w_3}{\mathrm{d}t} &= w_1w_2 - w_1w_3 - w_2w_3.
\end{aligned}
$$

The calculated generators are:

$$
\begin{aligned}
X_1 &= (1)\,\partial t,\\
X_2 &= \left(\frac{t^2}{2}\right)\partial t + (1)\,\partial w_1,\\
X_3 &= \left(\frac{t^2}{2}\right)\partial t + (1)\,\partial w_2,\\
X_4 &= (1)\,\partial w_3,\\
X_5 &= (-t)\,\partial t
\end{aligned}
$$

Run 11_08AM_25_June-2021

Degree in tangential ansätze: 1
The system of ODEs is given by:

$$
\begin{aligned}
\frac{\mathrm{d}w_1}{\mathrm{d}t} &= -w_1w_2 - w_1w_3 + w_2w_3,\\
\frac{\mathrm{d}w_2}{\mathrm{d}t} &= -w_1w_2 + w_1w_3 - w_2w_3,\\
\frac{\mathrm{d}w_3}{\mathrm{d}t} &= w_1w_2 - w_1w_3 - w_2w_3.
\end{aligned}
$$

The calculated generators are:

$$
\begin{aligned}
X_1 &= (1)\,\partial t,\\
X_2 &= \left(\frac{t^2}{2}\right)\partial t + (1)\,\partial w_1,\\
X_3 &= \left(\frac{t^2}{2}\right)\partial t + (1)\,\partial w_2,\\
X_4 &= (1)\,\partial w_3,\\
X_5 &= (-t)\,\partial t
\end{aligned}
$$

Run 11_11AM_25_June-2021

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

$$
\begin{aligned}
\frac{\mathrm{d}w_1}{\mathrm{d}t} &= -w_1w_2 - w_1w_3 + w_2w_3,\\
\frac{\mathrm{d}w_2}{\mathrm{d}t} &= -w_1w_2 + w_1w_3 - w_2w_3,\\
\frac{\mathrm{d}w_3}{\mathrm{d}t} &= w_1w_2 - w_1w_3 - w_2w_3.
\end{aligned}
$$

The calculated generators are:

$$
\begin{aligned}
X_1 &= (1)\,\partial t,\\
X_2 &= (w_3)\,\partial t,\\
X_3 &= (w_2)\,\partial t,\\
X_4 &= (w_1)\,\partial t,\\
X_5 &= (1)\,\partial w_1,\\
X_6 &=,\\
X_7 &=,\\
X_8 &= (-t)\,\partial t,\\
X_9 &= (1)\,\partial w_2,\\
X_{10} &=,\\
X_{11} &= (-t)\,\partial t,\\
X_{12} &=,\\
X_{13} &= \left(t^2\right)\partial t + (1)\,\partial w_3,\\
X_{14} &= (t)\,\partial t,\\
X_{15} &=,\\
X_{16} &=
\end{aligned}
$$

Chapter 2

hydons_model

Run 10_58AM_25_June-2021

Degree in tangential ansätze: 1
The system of ODEs is given by:

$$\begin{aligned}\frac{\mathrm{d}y_1}{\mathrm{d}t} &= \frac{ty_1 + y_2^2}{-t^2 + y_1 y_2},\\ \frac{\mathrm{d}y_2}{\mathrm{d}t} &= \frac{ty_2 + y_1^2}{-t^2 + y_1 y_2}.\end{aligned}$$

The calculated generators are:

$$X_1 = (t)\,\partial t + (y_1)\,\partial y_1 + (y_2)\,\partial y_2$$