Recipe for central manifold computations.

1. Decide around which fixed point you will perform the reduction.

2. Check that the linear part is written in Jordan block form, otherwise change coordinates.

3. Write down the equation for the manifold.

4. Set:

\[
\begin{align*}
    h_1 &= 0 \\
    h_{i+1} &= h_i + \Delta_{i+1}
\end{align*}
\]

where \(\Delta_{i+1}\) is a homogeneous polynomial of degree \(i + 1\) (e.g. for \(i = 1\) and 2 variables: \(\Delta_{i+1} = ax^2 + bxy + cy^2\); 2 variables in general: \(\Delta_{i+1} = \sum_{k=0}^{i+1} a_k x^{i+1-k} y^k\)).

5. Perform the following steps for each degree, starting with \(i = 1\) all the way up to the desired approximation level:

   (a) Write all terms containing \(\Delta\) on the left hand side and truncate the equation above degree \(i + 1\) (lower degrees are automatically eliminated because of the setup; eventual higher degrees are truncated away). The right hand side of the equation becomes automatically a known expression depending on \(h_i\), etc.

   (b) Solve the polynomial equation for the unknown coefficients in \(\Delta\).

   Special case: If the linearisation matrix in the manifold variables is identically zero, the left hand side becomes equal to \(\Delta_{i+1}\) and the right hand side is known. No particular setup for \(\Delta\) is needed, you just read the value of \(\Delta_{i+1}\) from the equation.