PRELIMINAR OBSERVATIONS:

This is the output of the example program II_SExpStructConst_sl2_S968.java.
It performs expansions of the sl(2) algebra,
[X_{1},X_{2}]= -2 X_{3} ,
[X_{1},X_{3}]= 2 X_{2} ,
[X_{2},X_{3}]= 2 X_{1} ,
with the semigroup S_{5}^{968}, whose multiplication table is given by:
1 1 1 1 1
1 2 2 4 4
1 2 3 4 5
1 4 4 2 2
1 4 5 2 3
The resonance that will be considered is:
S0 = {1,2,3}, S1 = {1,4,5},
and the zero element is: 1.

It gives the structure constants C_{(i,a)(j,b)}^{(k,c)}} of:
1) Expanded algebra
2) Resonant subalgebra
3) Reduced algebra
4) Reduction of the resonant subalgebra

NOTATION:

Using i,j,k=1,...,n and a,b,c=1,...,m, the structure constants of the expanded
algebra will be given as follows:
We first give m matrices C_{(1,a)(j,b)}^{(k,c)}
C_{(1,1)(j,b)}^{(k,c)}, C_{(1,2)(j,b)}^{(k,c)}, ..., C_{(1,m)(j,b)}^{(k,c)}}
Then the m matrices C_{(2,a)(j,b)}^{(k,c)}}
C_{(2,1)(j,b)}^{(k,c)}, C_{(2,2)(j,b)}^{(k,c)}, ..., C_{(2,m)(j,b)}^{(k,c)}}
and thus we continue until giving the m boxes C_{(n,a)(j,b)}^{(k,c)}}
C_{(n,1)(j,b)}^{(k,c)}, C_{(n,2)(j,b)}^{(k,c)}, ..., C_{(n,m)(j,b)}^{(k,c)}

In a similar way we give the selectors of the reduced algebra, resonant subalgebra
and reduction of
the resonant subalgebra, omitting the rows and comumns (i,a) that are not in the
corresponding algebra.
The range where the indices (i,a) are running is indicated for each case 1-4.

Finally, we remind that the method 'setStructureConstant()' reads the non-vanishing
structure constants C_{ij}^{k}
in such a way that i,j,k=0,1...,n-1. They are introduced as follows:

name.setStructureConstant(i , j , k , C_{ij}^{k})

Similarly a,b,c=0,1,...,m-1 in the functions C_{(i,a)(j,b)}^{(k,c)}.
However, the outputs will be given in such a way that i,j,k=1,...,n and
a,b,c=1,...,m.

We introduce the structure constants of sl2.
Remind that if a non vanishing structure constant C_{ij}^{k} has the
value V, then we introduce it as: name.setStructureConstant(i-1 , j-1 , k-1 , V)

Show its Killing-Cartan metric

```
 -8.00 0.00 0.00
 0.00 8.00 0.00
 0.00 0.00 8.00

whose determinant is:
-512.0

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NOTATION for the Expanded algebra:

n = 3 , Dimension of the original Lie algebra.
m = 5 , Order of the semigroup.

To print the structure constants notice that for (i,a) fixed,
the quantities C_{(i,a)(j,b)}^{(k,c)}=M_{A,B} are elements
of a matrix M whose indices have the following values:
A,B = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15,
Or equivalently,
A,B = (1,1), (1,2), (1,3), (1,4), (1,5), (2,1), (2,2), (2,3), (2,4), (2,5), (3,1),
(3,2), (3,3), (3,4), (3,5),

Here we print the m tables C_{(1,a) (j,b)}^{(k,c)}, with a=1,...,m.
******
C_{(1,1) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(1,2) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -2.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -2.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -2.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -2.0  -0.0
 0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(1,3) (j,b)}^{(k,c)}
```

```
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -2.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -2.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -2.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -0.0  -2.0
 0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0
******
C_{(1,4) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -2.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -2.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -2.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -2.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(1,5) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -2.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -0.0  -2.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -2.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -2.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
*****
Here we print the m tables C_{(2,a) (j,b)}^{(k,c)}, with a=1,...,m.
******
C_{(2,1) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0
```

```
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(2,2) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(2,3) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(2,4) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
```

```
 0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(2,5) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
*****
Here we print the m tables C_{(3,a) (j,b)}^{(k,c)}, with a=1,...,m.
******
C_{(3,1) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(3,2) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  -0.0  -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  -0.0  -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
```

******
C_{(3,3) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -2.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -2.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -0.0 -2.0 -0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -0.0 -0.0 -2.0 0.0 0.0 0.0 0.0 0.0
 -2.0 -0.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -2.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -0.0 -2.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -0.0 -0.0 -2.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -0.0 -0.0 -0.0 -2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
******
C_{(3,4) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -0.0 -2.0 -0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -0.0 -2.0 -0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -2.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -2.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0
 -2.0 -0.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -0.0 -0.0 -2.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -0.0 -0.0 -2.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -2.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -2.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
******
C_{(3,5) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -0.0 -2.0 -0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -0.0 -0.0 -2.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -2.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -2.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0
 -2.0 -0.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -0.0 -0.0 -2.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -0.0 -0.0 -0.0 -2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -2.0 -0.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 -0.0 -0.0 -2.0 -0.0 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
******
*****

NOTATION for the Resonant Subalgebra:

n = 3 , Dimension of the original Lie algebra.
m = 5 , Order of the semigroup.

To print the structure constants notice that for (i,a) fixed,
the quantities C_{(i,a)(j,b)}^{(k,c)}=M_{A,B} are elements
of a matrix M whose indices have the following values:
A,B = 1, 2, 3, 6, 9, 10, 11, 14, 15,
Or equivalently,
A,B = (1,1), (1,2), (1,3), (2,1), (2,4), (2,5), (3,1), (3,4), (3,5),

Here we print the matrices C_{(1,a) (j,b)}^{(k,c)}, with the double indices having
the values described above.
******
C_{(1,1) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0
 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0
******
C_{(1,2) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 -0.0 -2.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 -0.0 -2.0 -0.0
 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0
******
C_{(1,3) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 -0.0 -2.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -2.0
 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0
*****
Here we print the matrices C_{(2,a) (j,b)}^{(k,c)}, with the double indices having
the values described above.
******
C_{(2,1) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

```
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(2,4) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(2,5) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0
*****
Here we print the matrices C_{(3,a) (j,b)}^{(k,c)}, with the double indices having
the values described above.
******
C_{(3,1) (j,b)}^{(k,c)}
 0.0  0.0  0.0  -2.0  -0.0  -0.0  0.0  0.0  0.0
 0.0  0.0  0.0  -2.0  -0.0  -0.0  0.0  0.0  0.0
 0.0  0.0  0.0  -2.0  -0.0  -0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(3,4) (j,b)}^{(k,c)}
 0.0  0.0  0.0  -2.0  -0.0  -0.0  0.0  0.0  0.0
 0.0  0.0  0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0
 0.0  0.0  0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(3,5) (j,b)}^{(k,c)}
 0.0  0.0  0.0  -2.0  -0.0  -0.0  0.0  0.0  0.0
 0.0  0.0  0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0
 0.0  0.0  0.0  -0.0  -0.0  -2.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -0.0  -2.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
```

 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
*****

NOTATION for the Reduced Algebra:

n = 3 , Dimension of the original Lie algebra.
m = 5 , Order of the semigroup.

To print the structure constants notice that for (i,a) fixed,
the quantities C_{(i,a)(j,b)}^{(k,c)}=M_{A,B} are elements
of a matrix M whose indices have the following values:
A,B = 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15,
Or equivalently,
A,B = (1,2), (1,3), (1,4), (1,5), (2,2), (2,3), (2,4), (2,5), (3,2), (3,3), (3,4),
(3,5),

Here we print the matrices C_{(1,a) (j,b)}^{(k,c)}, with the double indices having
the values described above.
******
C_{(1,2) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -2.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -2.0 -0.0
 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0
******
C_{(1,3) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -0.0 -2.0 -0.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -2.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -0.0 -2.0
 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0
******
C_{(1,4) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -2.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -0.0 -0.0 -2.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0 -0.0
 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 -0.0 -0.0 -0.0

```
 0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(1,5) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -2.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -2.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  -0.0  -2.0  -0.0  -0.0
 0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0
*****
Here we print the matrices C_{(2,a) (j,b)}^{(k,c)}, with the double indices having
the values described above.
******
C_{(2,2) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(2,3) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(2,4) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
```

```
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(2,5) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  2.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
*****
Here we print the matrices C_{(3,a) (j,b)}^{(k,c)}, with the double indices having
the values described above.
******
C_{(3,2) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(3,3) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -0.0  -2.0  -0.0  -0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -2.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -2.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -0.0  -0.0  -2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(3,4) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0
 -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
```

```
 -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
******
C_{(3,5) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -0.0  -0.0  -0.0  -2.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -0.0  -2.0  -0.0  -0.0  0.0  0.0  0.0  0.0
 -0.0  -0.0  -2.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -0.0  -0.0  -2.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -2.0  -0.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 -0.0  -2.0  -0.0  -0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0  0.0
*****

-------------------

NOTATION for the Reduction of the Resonant Subalgebra:

n = 3 , Dimension of the original Lie algebra.
m = 5 , Order of the semigroup.

To print the structure constants notice that for (i,a) fixed,
the quantities C_{(i,a)(j,b)}^{(k,c)}=M_{A,B} are elements
of a matrix M whose indices have the following values:
A,B = 2, 3, 9, 10, 14, 15,
Or equivalently,
A,B = (1,2), (1,3), (2,4), (2,5), (3,4), (3,5),

Here we print the matrices C_{(1,a) (j,b)}^{(k,c)}, with the double indices having
the values described above.
******
C_{(1,2) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -2.0  -0.0
 0.0  0.0  0.0  0.0  -2.0  -0.0
 0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  2.0  0.0  0.0  0.0
******
C_{(1,3) (j,b)}^{(k,c)}
 0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  0.0  0.0
 0.0  0.0  0.0  0.0  -2.0  -0.0
 0.0  0.0  0.0  0.0  -0.0  -2.0
 0.0  0.0  2.0  0.0  0.0  0.0
 0.0  0.0  0.0  2.0  0.0  0.0
*****
Here we print the matrices C_{(2,a) (j,b)}^{(k,c)}, with the double indices having
the values described above.
******
```

C_{(2,4) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 2.0 0.0
 0.0 0.0 0.0 0.0 2.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0
 2.0 0.0 0.0 0.0 0.0 0.0
 2.0 0.0 0.0 0.0 0.0 0.0
******
C_{(2,5) (j,b)}^{(k,c)}
 0.0 0.0 0.0 0.0 2.0 0.0
 0.0 0.0 0.0 0.0 0.0 2.0
 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0
 2.0 0.0 0.0 0.0 0.0 0.0
 0.0 2.0 0.0 0.0 0.0 0.0
*****
Here we print the matrices C_{(3,a) (j,b)}^{(k,c)}, with the double indices having the values described above.
******
C_{(3,4) (j,b)}^{(k,c)}
 0.0 0.0 -2.0 -0.0 0.0 0.0
 0.0 0.0 -2.0 -0.0 0.0 0.0
 -2.0 -0.0 0.0 0.0 0.0 0.0
 -2.0 -0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0
******
C_{(3,5) (j,b)}^{(k,c)}
 0.0 0.0 -2.0 -0.0 0.0 0.0
 0.0 0.0 -0.0 -2.0 0.0 0.0
 -2.0 -0.0 0.0 0.0 0.0 0.0
 -0.0 -2.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0
 0.0 0.0 0.0 0.0 0.0 0.0
*****
