

We introduce the structure constants of sl2
We show the Killing-Cartan metric

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

and its determinant
-512.0

In what follows we expand sl2 with all the abelian semigroups of order 5 having
a resonance; and identify the ones that leads to a semisimple algebra.

A semisimple algebra has been found, expanding with the semigroup #770

```
1 1 1 1 1
1 2 1 1 5
1 1 3 4 1
1 1 4 3 1
1 5 1 1 2
```

whith the resonance:

S0: 1 2 3

S1: 1 4 5

The metric of the reduction of the resonant subalgebra is:

```
-8.00 -8.00 -8.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -16.00 -8.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -8.00 -16.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 8.00 8.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 16.00 8.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 8.00 16.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 8.00 8.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 16.00 8.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 8.00 16.00
```

and its determinant
-1.34217728E8

A semisimple algebra has been found, expanding with the semigroup #779

```
1 1 1 1 1
1 2 1 2 2
1 1 3 3 3
1 2 3 4 5
1 2 3 5 4
```

whith the resonance:

S0: 1 2 3 4

S1: 1 2 3 5

The metric of the reduction of the resonant subalgebra is:

```

-8.00 -8.00 -8.00 -8.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -16.00 -8.00 -16.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -8.00 -16.00 -16.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -16.00 -16.00 -32.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 8.00 8.00 8.00 8.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 8.00 16.00 8.00 16.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 8.00 8.00 16.00 16.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 8.00 16.00 16.00 32.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 8.00 8.00 8.00 8.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 8.00 16.00 8.00 16.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 8.00 8.00 16.00 16.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 8.00 16.00 16.00 32.00

```

and its determinant

6.8719476736E10

A semisimple algebra has been found, expanding with the semigroup #922

1 1 1 1 1

1 2 2 2 2

1 2 3 3 3

1 2 3 4 5

1 2 3 5 4

with the resonance:

S0: 1 2 3 4

S1: 1 2 3 5

The metric of the reduction of the resonant subalgebra is:

```

-8.00 -8.00 -8.00 -8.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -16.00 -16.00 -16.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -16.00 -24.00 -24.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -16.00 -24.00 -32.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 8.00 8.00 8.00 8.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 8.00 16.00 16.00 16.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 8.00 16.00 24.00 24.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 8.00 16.00 24.00 32.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 8.00 8.00 8.00 8.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 8.00 16.00 16.00 16.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 8.00 16.00 24.00 24.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 8.00 16.00 24.00 32.00

```

and its determinant

6.8719476736E10

A semisimple algebra has been found, expanding with the semigroup #968

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

with the resonance:

S0: 1 2 3

S1: 1 4 5

The metric of the reduction of the resonant subalgebra is:

```

-8.00 -8.00 -8.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -16.00 -16.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -16.00 -24.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 8.00 8.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 16.00 16.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 16.00 24.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 8.00 8.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 16.00 16.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 16.00 24.00

```

and its determinant

-1.34217728E8

A semisimple algebra has been found, expanding with the semigroup #990

1 1 1 1 1

1 2 3 4 5

1 3 2 5 4

1 4 5 2 3

1 5 4 3 2

with the resonance:

S0: 1 2 5

S1: 1 3 4

The metric of the reduction of the resonant subalgebra is:

```

-8.00 -8.00 -8.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -24.00 -8.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -8.00 -24.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 8.00 8.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 24.00 8.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 8.00 24.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 8.00 8.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 24.00 8.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 8.00 24.00

```

and its determinant

-8.589934592E9

A semisimple algebra has been found, expanding with the semigroup #991

1 1 1 1 1

1 2 3 4 5

1 3 2 5 4

1 4 5 3 2

1 5 4 2 3

with the resonance:

S0: 1 2 3

S1: 1 4 5

The metric of the reduction of the resonant subalgebra is:

```

-8.00 -8.00 -8.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -24.00 -8.00 0.00 0.00 0.00 0.00 0.00 0.00
-8.00 -8.00 -24.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 8.00 8.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 8.00 24.00 0.00 0.00 0.00
0.00 0.00 0.00 8.00 24.00 8.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 8.00 8.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 8.00 24.00
0.00 0.00 0.00 0.00 0.00 0.00 8.00 24.00 8.00

```

and its determinant

-8.589934592E9

A semisimple algebra has been found, expanding with the semigroup #1119

1 1 1 4 5

1 2 3 4 5

1 3 2 4 5

4 4 4 5 1

5 5 5 1 4

with the resonance:

S0: 1 2 4 5

S1: 1 3 4 5

The metric of the reduction of the resonant subalgebra is:

```

-24.00 -24.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
-24.00 -32.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 -24.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 -24.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 24.00 24.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 24.00 32.00 0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 24.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 24.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 24.00 24.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 24.00 32.00 0.00 0.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 24.00
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 24.00 0.00

```

and its determinant

-1.352605460594688E15

There are 299 semigroups of order 5 at least one resonant decomposition.

In total, there are 1653 different resonant decompositions.

And 7 of them leads to a semisimple algebra.

There are 0 semigroups having more than one resonance and leading to semisimple algebras with all those resonances.