math_666_17

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```
%gap
G:=SymmetricGroup(3);
F:=GF(2);
A:=GroupRing(F,G);
```

```
Sym( [ 1 .. 3 ] )
GF(2)
<algebra-with-one over GF(2), with 2 generators>
```

```
%gap
AA:=RegularModule(G,F)[2];
b:=MTX.BasesSubmodules(AA);
```

```
rec( IsOverFiniteField := true, dimension := 6, field := GF(2),
  generators := [ <an immutable 6x6 matrix over GF2>,
      <an immutable 6x6 matrix over GF2> ], isMTXModule := true )
[ [  ], <an immutable 1x6 matrix over GF2>, <an immutable 2x6 matrix over GF2>
    , <an immutable 2x6 matrix over GF2>, <an immutable 2x6 matrix over GF2>,
  <an immutable 2x6 matrix over GF2>, <an immutable 3x6 matrix over GF2>,
  <an immutable 3x6 matrix over GF2>, <an immutable 3x6 matrix over GF2>,
  <an immutable 4x6 matrix over GF2>, <an immutable 4x6 matrix over GF2>,
  <an immutable 4x6 matrix over GF2>, <an immutable 4x6 matrix over GF2>,
  <an immutable 5x6 matrix over GF2>, <an immutable 6x6 matrix over GF2> ]
```

```
%gap
MTX.CollectedFactors(AA);
```

```
[ [ rec( IsAbsolutelyIrreducible := true, IsIrreducible := true,
        IsOverFiniteField := true, dimension := 1, field := GF(2),
        generators := [ <an immutable 1x1 matrix over GF2>,
            <an immutable 1x1 matrix over GF2> ], isMTXModule := true,
        smashMeataxe :=
          rec(
            algebraElement :=
              [ [ [ 2, 1 ], [ 1, 2 ] ], [ Z(2)^0, 0*Z(2), 0*Z(2), 0*Z(2) ] ]
              , algebraElementMatrix := <an immutable 1x1 matrix over GF2>,
            characteristicPolynomial := x_1+Z(2)^0,
            charpolFactors := x_1+Z(2)^0, degreeFieldExt := 1,
```

```
          ndimFlag := 1, nullspaceVector := [ Z(2)^0 ] ) ), 2 ],
[
   rec( IsAbsolutelyIrreducible := true, IsIrreducible := true,
      IsOverFiniteField := true, dimension := 2, field := GF(2),
      generators := [ <an immutable 2x2 matrix over GF2>,
          <an immutable 2x2 matrix over GF2> ], isMTXModule := true,
      smashMeataxe :=
        rec( algebraElement := [ [ [ 2, 1 ] ], [ 0*Z(2), Z(2)^0, 0*Z(2) ]
             ], algebraElementMatrix := <an immutable 2x2 matrix over GF2>
           , characteristicPolynomial := x_1^2+Z(2)^0,
          charpolFactors := x_1+Z(2)^0, degreeFieldExt := 1,
          ndimFlag := 1,
          nullspaceVector := <an immutable GF2 vector of length 2> ) ), 2
  ] ]
```