Tutorial 4

Betti numbers and generic ideals

Resolutions and Betti numbers

```
Use R ::= Q[x,y,z];

I := Ideal(x^2, y^3, z^4);
Res(I);
$gb.GetBettiMatrix(I);
BettiDiagram(I);

ResI := Res(I);
Set Indentation;
Untagged(ResI);
Unset Indentation;

Syz(I,1);
Syz(I,2);
```

Eliahou-Kervaire resolution

```
Define EKMax(PP)
  If PP=1 Then Return 0; EndIf;
  LogPP := Log(PP);
  Return Max([ I In 1..Len(LogPP) | LogPP[I]>0 ]);
EndDefine; -- EKMax

EKMax(xy);
EKMax(x^6z);
EKMax(x);

Define M(I,J,A)
  Return Len([ PP In A | EKMax(PP)=I And Deg(PP)=J ]);
EndDefine; -- M
```

Ideal operations

```
J := Ideal(xyz);
I + J;
I : J;  Colon(I, J);
Intersection(I,J);
```