

Tutorial 5

Betti numbers and generic ideals

Ideal generated in degree d : $I_{\langle d \rangle}$

```
Define IdealGendInDeg(I, D)
  M := Ideal(Indets());
  Return Sum([ Ideal(F)*M^(D-Deg(F)) | F In Gens(I) And Deg(F)<=D]);
EndDefine; -- IdealGendInDeg
```

```
I := Ideal(x^2, y^3, z^4);
IdealGendInDeg(I, 2);
IdealGendInDeg(I, 3);
IdealGendInDeg(I, 4);
IdealGendInDeg(I, 5);
```

Distractions

```
Define RandDensePoly(D, A, B) -- a DensePoly with coeffs in A..B
  F := DensePoly(D);
  Return Sum([ Rand(A, B)*T | T In Support(F)]);
EndDefine;
RandDensePoly(1, -5, 5);
```

```
Define Distraction(L, PP)
  Dsrt := 1;
  LogPP := Log(PP);
  For I := 1 To Len(LogPP) Do
    Dsrt := Dsrt * Product([ L[I,J] | J In (1..LogPP[I])]);
  EndFor;
  Return Dsrt;
EndDefine; -- Distraction
```

```
LRand := [[ RandDensePoly(1, -10, 10) | J In 1..100 | I In 1..NumIndets() ];
LTriv := [[ Indet(I) | J In 1..100 | I In 1..NumIndets() ];
```

```
Distraction(LTriv, xyz);
Distraction(LRand, xyz);
Factor(It);
Distraction(LRand, x^2yz);
Factor(It);
```