

EXAMPLE FILE FOR M2INTEX

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1. INTRODUCTION

some basic examples:

```
i1 : R=QQ[x,y]; factor(x^3-y^3)
o2 = (x - y) (x^2 + x y + y^2)
o2 : Expression of class Product
i3 : res coker vars R
o3 = 
$$\begin{array}{ccccccc} R^1 & \xleftarrow{\begin{pmatrix} x & y \end{pmatrix}} & R^2 & \xleftarrow{\begin{pmatrix} -y \\ x \end{pmatrix}} & R^1 & \xleftarrow{0} & 0 \\ 0 & & 1 & & 2 & & 3 \end{array}$$

o3 : ChainComplex
i4 : OO_(Proj(R/(x^3-y^3)))^{1,2}
o4 = 
$$\mathcal{O}_{\text{Proj}\left(\frac{R}{x^3-y^3}\right)}^1(1) \oplus \mathcal{O}_{\text{Proj}\left(\frac{R}{x^3-y^3}\right)}^1(2)$$

o4 : coherent sheaf on Proj  $\left(\frac{R}{x^3-y^3}\right)$ , free
i5 : matrix {{1,2},{3,4}}
o5 = 
$$\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$$

o5 : Matrix  $\mathbb{Z}^2 \longleftarrow \mathbb{Z}^2$ 
more:
i6 : 318/46
o6 =  $\frac{159}{23}$ 
o6 :  $\mathbb{Q}$ 
i7 : exp 3.73767
o7 = 42.0000160321016
o7 :  $\mathbb{R}$  (of precision 53)
strings:
i8 : "hehe"
o8 = hehe
and nets:
i9 : "haha123456789"||"hoho!@#\$%^&*"
o9 = haha123456789
      hoho!@#\$%^&*(
printing:
i10 : for i from 1 to 4 do print(i+ii)
1 + i
2 + i
3 + i
4 + i
```

2. HELP

```
i11 : help det
```

```
o11 =
```

determinant – determinant of a matrix

Synopsis

- Usage:
det M
- Inputs:
-- M, a square matrix
- Optional inputs:
-- Strategy => ..., default value null, choose between Bareiss and Cofactor algorithms
- Outputs:
-- a ring element, which is the determinant of M

Description

See also

- exteriorPower -- exterior power
- minors -- ideal generated by minors
- permanents -- ideal generated by square permanents of a matrix
- pfaffians -- ideal generated by Pfaffians

Ways to use determinant :

- "determinant(Matrix)"
- "determinant(MutableMatrix)"

For the programmer

The object determinant is a method function with options.

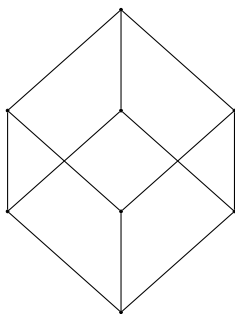
```
o11 : DIV
```

3. PACKAGES

packages that have a tex output will work:

```
i12 : needsPackage "Posets";
```

```
i13 : booleanLattice 3
```



```
o13 =
```

```
o13 : Poset
```

4. TRICKY EXAMPLES

```

i14 : -- some tricky examples
A bunch of complicated cases: a multi-line example
      f = i -> (
      -- that's dumb
      i+1
      )
o14 = f
o14 : FunctionClosure
and another weirder one:
i15 : I=ideal 0; f = i -> (
o15 : Ideal of ℤ
      i+1)
o16 = f
o16 : FunctionClosure
finally:
i17 : a=1;b=2;
i19 : c=3;
That last one has no output.

```

5. REUSING OUTPUT

The output o5 is $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$. The nonexistent output o18 is .

6. INPUTTING FROM EXTERNAL FILE

Some more code:

```

i20 : -- a test file
      R=QQ[x,y,z]
o20 = R
o20 : PolynomialRing
i21 : poicare ideal(x^2+y^2,x^3+z^3)
o21 = 1 - T^2 - T^3 + T^5
o21 : ℤ[T]

```

7. CHANGING KEY/VALUES

```

i22 : "some_weird_spacing_and_string_style"
o22 = some weird spacing and string style

```