

# *Polymake useful commands*

## **Initiating objects**

```
$p = new Polytope(POINTS=>[[1,0,0,0],[1,0,1,0],[1,0,0,1]]);
```

*Defines a polytope \$p by giving its points.*

```
$p = new Polytope(INEQUALITIES=>$matrix, EQUATIONS=>$matrix);
```

*Defines a polytope \$p by giving the inequalities and equations.*

```
$c = new Cone(RAYS=>[[1,0],[0,1]]);
```

*Defines a cone via its rays.*

## **Standard polytopes**

```
cube(n)
```

```
simplex(n)
```

## **A list of properties**

```
VERTICES
```

```
N_LATTICE_POINTS
```

```
INTERIOR_LATTICE_POINTS
```

```
EHRHART_POLYNOMIAL
```

```
REFLEXIVE
```

```
SMOOTH
```

```
DIM
```

```
HILBERT_BASIS
```

```
SMOOTH_CONE
```

## **How to check a property**

```
print $p->VERTICES;
```

```
print $p->SMOOTH;
```

## **Properties**

```
$p->properties;
```

*Shows all the properties of \$p which polymake has needed to compute so far.*

## **Useful functions**

```
polarize($p);
```

*computes the dual of a polytope*

```
$m->minor(All,~[0]);
```

*Computes minor of a matrix \$m with all rows and without the  $\alpha^{\text{th}}$  column*