# Install f4 in Sage

## 1 Directory SAGE_ROOT/upstream

Just place the f4 archive there.

## 2 Directory SAGE_ROOT/build/pkgs

Place here the f4 directory containing :
— package-version.txt
— spkg-check
— spkg-install
— SPKG.txt

## 3 Directory SAGE_ROOT/src/sage/rings/polynomial

— Add the file groebner_basis_f4.pyx
— Modify the function groebner_basis in the file multi_polynomial_ideal.py :
Add

```
from sage.rings.polynomial.groebner_basis_f4 import groebner_basis_f4
```

after the other imports and

```
elif algorithm == 'f4':
            gb = groebner_basis_f4(self, *args, **kwds)
```

into the list of algorithms selection.

## 4 Directory SAGE_ROOT/src

Add the module to module_list.py :

```
Extension('sage.rings.polynomial.groebner_basis_f4',
      sources = ['sage/rings/polynomial/groebner_basis_f4.pyx'],
      language="c++",
      #libraries = ["f4", 'givaro', 'gmpxx', 'gmp'],
      libraries = ["f4"],
      depends = [SAGE_INC + "/libf4.h"]),
```

in section “sage.rings.polynomial”.

## 5 Directory SAGE_ROOT

Finally create a checksum for the package : ./sage -sh sage-fix-pkg-checksums,
build / install the package : ./sage -i -c -f f4
and run ./sage -br to update the cython code.