```
> restart;
```

We make use of the following packages:

```
> with(RegularChains): with(SemiAlgebraicSetTools):
```

Additionally, we use Maple code written at the University of Bath: The ProjectionCAD package (should be hosted alongside this worksheet).

```
> read("ProjectionCAD.mpl"):  with(ProjectionCAD):
```

The example set used in Section 8.2 is stored in Maple formats in the following textfile.

```
> read("Section82-ExampleSet.txt");
```

We can access examples by number. Two input formats are available:

The first gives input suitable for sign-invariant CAD

```
> I1, I2 := GenerateInput(19, "CAD");
```

$$I1, I2 := [x^2+y^2-1, 4xy-1, x^2+y^2-8x-2y+16, 4xy-4x-16y+15], [y, x]$$

We can build these CADs using either:

- Projection and Lifting implemented in the ProjectionCAD Package (FullCAD in Table 2);

```
> CADFull(I1, I2, method=McCallum, output=list): nops(%);
```

$$317$$

- Regular Chains implemented in the RegularChains Library of Maple (Maple in Table 2).

```
> CylindricalAlgebraicDecompose( I1, PolynomialRing(I2), output=
  list): nops(%);
```

$$317$$

The second gives output suitable for TTICAD by Projection and Lifting implemented in Projection CAD Package (TTICAD in Table 2).

```
> I1, I2 := GenerateInput(19, "TTICAD");
```

$$I1, I2 := [[y^2+x^2-1, [4yx-1]], [y^2+x^2-2y-8x+16, [4yx-16y-4x+15]]], [y, x]$$

```
> TTICAD( I1, I2, output=list): nops(%);
```

$$105$$

Note that the timings reported in Section 8.2 were found when running in command line mode using Maple 16.