

We are using the standard Maple 16 Library

```
> libname := "/home/me350/Programs/Maple16/lib":
```

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 experiments below were reported in Section 8.3

```
> for i from 0 to 5 do
  f[i+1] := (x-4*i)^2 + (y-i)^2 - 1:
  g[i+1] := (x-4*i)*(y-i) - 1/4:
  FF[i+1] := [seq(op([f[j],g[j]]),j=1..i+1)]:
  Phi[i+1] := [seq([f[j],[g[j]]],j=1..i+1) ]:
  PSI[i+1] := [seq([f[j],[g[j]]],j=1..i), [[],[f[i+1],g[i+1]]] ]:
  ECPHi[i+1] := [ mul(f[j], j=1..i+1),
                 [seq( op([f[j],g[j]]), j=1..i+1)] ]:
```

od:

```
> for i from 1 to 6 do
  print("-----",i,"-----");
  print("-----",phi,"-----");
  cf:=CADFull( FF[i], [y,x], method=McCallum );
  print( full-cad, nops(cf));
  ECCAD( ECPHi[i], [y,x] ):
  print( implicit-eccad, nops(%));
  ECCAD( ECPHi[i], [y,x], LiftAll=true ):
  print( implicit-qepcad, nops(%));
  TTICAD( Phi[i], [y,x] ):
  print( tticad-phi, nops(%));
  print("-----",psi,"-----");
  TTICAD( PSI[i], [y,x] ):
  print( full-cad, nops(cf));
  print( tticad-psi, nops(%));
```

od:

```
"-----", 1, "-----"
      "-----",  $\phi$ , "-----"
            full - cad, 83
            implicit - eccad, 53
            implicit - qepcad, 69
            tticad -  $\phi$ , 53
      "-----",  $\psi$ , "-----"
            full - cad, 83
            tticad -  $\psi$ , 83
"-----", 2, "-----"
      "-----",  $\phi$ , "-----"
            full - cad, 317
            implicit - eccad, 145
            implicit - qepcad, 249
            tticad -  $\phi$ , 105
```

"-----", ψ , "-----"
full – cad, 317
tticad – ψ , 183

"-----", 3, "-----"

"-----", ϕ , "-----"
full – cad, 695
implicit – eccad, 237
implicit – qepcad, 509
tticad – ϕ , 157

"-----", ψ , "-----"
full – cad, 695
tticad – ψ , 259

"-----", 4, "-----"

"-----", ϕ , "-----"
full – cad, 1241
implicit – eccad, 329
implicit – qepcad, 849
tticad – ϕ , 209

"-----", ψ , "-----"
full – cad, 1241
tticad – ψ , 335

"-----", 5, "-----"

"-----", ϕ , "-----"
full – cad, 1979
implicit – eccad, 421
implicit – qepcad, 1269
tticad – ϕ , 261

"-----", ψ , "-----"
full – cad, 1979
tticad – ψ , 411

"-----", 6, "-----"

"-----", ϕ , "-----"
full – cad, 2933
implicit – eccad, 513
implicit – qepcad, 1769
tticad – ϕ , 313

"-----", ψ , "-----"
full – cad, 2933
tticad – ψ , 487