```
> # hw13JohnHermitt
  # RUID: 184007421
  # ok to post
  read "/Users/jch263/Documents/M13.txt";
  Help13( )
```

RT2(x,y,d,K), Orb2(F,x,y,pt0,K1,K2), FP2(F,x,y), SFP2(F,x,y), PlotOrb2(L), FP2drz(F,x,y), SFP2drz(F,x,y) **(1)**

```
> #2
  f := [ (1·x^2 + 8·x + 4)/(1·x^2 + 0·x + 0), (7·x^2 + 8·x + 4)/(4·x^2 + 0·x + 4) ];
  evalf(FP2(f, x, y));
  SFP2(f, x, y);
  Orb2(f, x, y, [8.5, 0.5], 1000, 1010);
```

$$f := \left[\frac{x^2 + 8x + 4}{x^2}, \frac{7x^2 + 8x + 4}{4x^2 + 4} \right]$$

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[[3.561552813, 2.215711706]]

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```
> #3
  t := 0 :
  fp := { } :
  while t < 20 do
  d := RT2(x, y, 1, 100) :
  t := t + 1 :
  fp := {op(f), FP2drz(d, x, y)} :
  sfp := SFP2drz(d, x, y) :
  print(sf);
  orb := evalf(Orb2(d, x, y, [6, 9.42], 1000, 1010)) :
  print(orb);
  od:
```

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```

```
> #4
  # i
  RT3 := proc(x, y, z, d, K)
  local ra, i, j, k, f, g, h;
  ra := rand(1 ..K);
  f := (add(add(add(random( ) · x^i · y^j · z^k, k = 0 ..d − j), j = 0 ..d − i), i = 0 ..d)) / add(add(add(random( ) · x^i · y^j · z^k, k = 0 ..d − j), j = 0 ..d − i), i = 0 ..d);
  g := (add(add(add(random( ) · x^i · y^j · z^k, k = 0 ..d − j), j = 0 ..d − i), i = 0 ..d)) / add(add(add(random( ) · x^i · y^j · z^k, k = 0 ..d − j), j = 0 ..d − i), i = 0 ..d);
  h := (add(add(add(random( ) · x^i · y^j · z^k, k = 0 ..d − j), j = 0 ..d − i), i = 0 ..d)) / add(add(add(random( ) · x^i · y^j · z^k, k = 0 ..d − j), j = 0 ..d − i), i = 0 ..d);
  [f, g, h];
  end proc:

  #ii & iii
  Orb3 := proc(F, x, y, z, pt0, K1, K2)
  local pt, L, i;
  pt := pt0;
  for i to K1 do
  pt := subs({x = pt[1], y = pt[2], z = pt[3]}, F)
  end do;
  L := [ ];
  for i from K1 + 1 to K2 do
  L := [op(L), pt];
  pt := subs({x = pt[1], y = pt = [2], z = pt[3]}, F)
  end do;
  L
```

```
    end proc:

    #iv
    FP3 := proc(F, x, y, z)
    local L, i;
    L := [solve({F[1] = x • F[2] = y • F[3] = z}, {x, y, z})];
    [seq(subs(L[i], [x, y, z]), i = 1 ..nops(L))]
    end proc:

    #v
    SFP3 := proc(F, x, y, z)
    local L, J, S, J0, i, pt, EV;
    L := evalf(FP3(F, x, y, z));
    J := Matrix(normal([[diff(F[1], x), diff(F[2], x), diff(F[3], x)], [diff(F[1], y), diff(F[2],
        y), diff(F[3], y)], [diff(F[1], z), diff(F[2], z), diff(F[3], z)]]));
    S := [];
    for i to nops(L) do
    pt := L[i];
    J0 := subs({x = pt[1], y = pt[2], z = pt[3]}, J);
    EV := LinearAlgebra:-Eigenvalues(J0);
    if abs(EV[1]) < 1 and abs(EV[2]) < 1 and abs(EV[3]) < 1 then
    S := [op(S), pt]
    end if
    end do;
    S
    end proc:
> #5
    t := 0 :
    while t < 10 do
    a := RT3(x, y, z, 1, 100) :
    fp3 := {op(fp3), evalf(FP3(a, x, y, z))};
    sfp3 := SFP3(a, x, y, z);
    print(sfp3);
    orb3 := evalf(Orb3(a, x, y, z, [6, 9, 4.2], 1000, 1010), 10);
    print(orb3);
    t := t + 1 :
    od:
Error, recursive assignment
>
```