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#Homework-8
#Okay to post
#Ans-2
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#The code was not running for me initially so I modified the Orb function and added eval in one of the lines, and it gave me the decimal output after that

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#Orb(f,x,x0,K1,K2): Inputs an expression f in x (describing) a function of x, an initial point, x0, and
a positive integer K, outputs
#the values of x[n] from n=K1 to n=K2. Try: where x[n]=f(x[n-1]), . Try:
#Orb(2*x*(1-x),x,0.4,1000,2000);
Orb := proc(f, x, x0, K1, K2) local x1, i, L :
x1 := x0 :
for i from 1 to K1 do
  x1 := eval(subs(x=x1,f) ) :
  #we don't record the first values of K1, since we are interested in the long-time behavior of the orbit
od:

L := [x1] :

for i from K1 to K2 do
  x1 := eval(subs(x=x1,f) ) : #we compute the next member of the orbit
  L := [op(L), x1] : #we append it to the list
od:

L : #that's the output

end:
```

```
Orb(2·x·(1-x), x, 0.9, 1, 5)
      [0.18, 0.2952, 0.41611392, 0.4859262512, 0.4996038592, 0.4999996862 ] (1)
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```
Orb(x·(1-x), x, 0.5, 1, 1000)
[0.25, 0.1875, 0.15234375, 0.1291351318, 0.1124592495, 0.09981216670, 0.08984969808, (2)
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0.001034509901, 0.001033439690, 0.001032371692, 0.001031305901, 0.001030242309,
0.001029180910, 0.001028121697, 0.001027064663, 0.001026009801, 0.001024957105,
0.001023906568, 0.001022858183, 0.001021811944, 0.001020767844, 0.001019725877,
0.001018686036, 0.001017648315, 0.001016612707, 0.001015579206, 0.001014547805,
0.001013518498, 0.001012491278, 0.001011466139, 0.001010443075, 0.001009422080,
0.001008403147, 0.001007386270, 0.001006371443, 0.001005358660, 0.001004347914,
0.001003339199, 0.001002332509, 0.001001327839, 0.001000325182, 0.0009993245315,
0.0009983258820, 0.0009973292274, 0.0009963345618, 0.0009953418792,
0.0009943511737, 0.0009933624394, 0.0009923756705, 0.0009913908610,
0.0009904080051]

$Orb(2 \cdot x \cdot (1 - x), x, 0.5, 1, 1000)$

read "C:/Users/rmn74/Documents/M9.txt"

Help9()

Orb(f,x,x0,K1,K2), Orb2D(f,x,x0,K), FP(f,x), SFP(f,x), Comp(f,x)

(1)

$$x(n) := \frac{(7 \cdot x(n-1) + x(n-2))}{x(n-1) + 2 \cdot (n-2)}$$

$$x := n \mapsto \frac{7 \cdot x(n-1) + x(n-2)}{x(n-1) + 2 \cdot n - 4}$$

(2)

$x(0) := 0.5 :$

$x(1) := 0.7 :$

[*seq*($x(i), i=2..18$)]

[7.714285714, 5.630882355, 4.893680602, 3.661448139, 2.617498033, 1.742337056,

(3)

1.077972208, 0.6160074036, 0.3243874358, 0.1575342949, 0.07079871374,

0.02959228162, 0.01156676658, 0.004250403241, 0.001475475640, 0.0004859338578,

0.0001524043308]

$x(18)$

0.0001524043308

(4)