```
> funcs := map(_ → raRF(x, 3), [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10])
```

$$funcs := \left[\frac{3x^3+3x^2+7x+7}{10x^3+8x^2+3x+5}, \frac{3x^3+x^2+x+3}{10x^3+10x^2+5x+5}, \frac{4x^3+8x^2+2x+10}{9x^3+5x^2+9x+2}, \right. \tag{1}$$
$$\frac{10x^3+3x^2+4x+7}{9x^3+4x^2+10x+9}, \frac{x^3+9x^2+8x+7}{7x^3+4x^2+2x+10}, \frac{4x^3+6x^2+x+8}{9x^3+2x^2+7x+1},$$
$$\frac{4x^3+9x^2+9x+5}{4x^3+6x^2+4x+3}, \frac{2x^3+8x^2+10x+4}{3x^3+5x^2+2x+7}, \frac{4x^3+5x^2+7x+5}{2x^3+10x^2+8x+6},$$
$$\left. \frac{8x^3+4x^2+8x+6}{10x^3+4x^2+9x+7}, \frac{x^3+9x^2+2x+3}{4x^3+2x^2+5x+1} \right]$$

```
> stableSteadyStates = map(f → evalf(SSS(f, x)), funcs)
```

$$stableSteadyStates = [[0.8620096788], [0.4042380413], [0.9747201978], [0.6982012560], \tag{2}$$
$$[1.070745313], [1.], [1.460448809], [1.406545762], [0.7994227258], [0.8696205581],$$
$$[1.197066008, -1.260488554]]$$

```
> for x0 in [-100.1, -10.1, 10.1, 100.1] do
    for f in funcs do
      print(`x0 = `, x0); print(`f =`, f) :
      print(`SSS :=`, evalf(SSS(f, x))) ;
      print(`Orb =`, Orb(f, x, x0, 2000, 2020)) ;
    end
  end:
```

$$x0 = , -100.1$$

$$f =, \frac{3x^3+3x^2+7x+7}{10x^3+8x^2+3x+5}$$

$$SSS :=, [0.8620096788]$$

$$Orb =, [0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794,$$
$$0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794,$$
$$0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794,$$
$$0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794]$$

$$x0 = , -100.1$$

$$f =, \frac{3x^3+x^2+x+3}{10x^3+10x^2+5x+5}$$

$$SSS :=, [0.4042380413]$$

$$Orb =, [0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416,$$

0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416]

$$x0 = , -100.1$$

$$f =, \frac{4x^3 + 8x^2 + 2x + 10}{9x^3 + 5x^2 + 9x + 2}$$

$$SSS :=, [0.9747201978]$$

$Orb =, [0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982]$

$$x0 = , -100.1$$

$$f =, \frac{10x^3 + 3x^2 + 4x + 7}{9x^3 + 4x^2 + 10x + 9}$$

$$SSS :=, [0.6982012560]$$

$Orb =, [0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562]$

$$x0 = , -100.1$$

$$f =, \frac{x^3 + 9x^2 + 8x + 7}{7x^3 + 4x^2 + 2x + 10}$$

$$SSS :=, [1.070745313]$$

$Orb =, [1.070745313, 1.070745313]$

$$x0 = , -100.1$$

$$f =, \frac{4x^3 + 6x^2 + x + 8}{9x^3 + 2x^2 + 7x + 1}$$

$$SSS :=, [1.]$$

$Orb =, [1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989,$

1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001]

$$x0 = , -100.1$$

$$f =, \frac{4x^3 + 9x^2 + 9x + 5}{4x^3 + 6x^2 + 4x + 3}$$

$$SSS :=, [1.460448809]$$

Orb =, [1.460448809, 1.460448809]

$$x0 = , -100.1$$

$$f =, \frac{2x^3 + 8x^2 + 10x + 4}{3x^3 + 5x^2 + 2x + 7}$$

$$SSS :=, [1.406545762]$$

Orb =, [1.406545762, 1.406545762]

$$x0 = , -100.1$$

$$f =, \frac{4x^3 + 5x^2 + 7x + 5}{2x^3 + 10x^2 + 8x + 6}$$

$$SSS :=, [0.7994227258]$$

Orb =, [0.7994227260, 0.7994227260]

$$x0 = , -100.1$$

$$f =, \frac{8x^3 + 4x^2 + 8x + 6}{10x^3 + 4x^2 + 9x + 7}$$

$$SSS :=, [0.8696205581]$$

Orb =, [0.8696205577, 0.8696205577,

0.8696205577, 0.8696205577, 0.8696205577, 0.8696205577]

$$x0 = , -100.1$$

$$f =, \frac{x^3 + 9\,x^2 + 2\,x + 3}{4\,x^3 + 2\,x^2 + 5\,x + 1}$$

$$SSS :=, [1.197066008, -1.260488554]$$

$Orb =, [1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007,$
1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007,
1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007,
1.197066008, 1.197066007, 1.197066008]

$$x0 = , -10.1$$

$$f =, \frac{3\,x^3 + 3\,x^2 + 7\,x + 7}{10\,x^3 + 8\,x^2 + 3\,x + 5}$$

$$SSS :=, [0.8620096788]$$

$Orb =, [0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794,$
0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794,
0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794,
0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794]

$$x0 = , -10.1$$

$$f =, \frac{3\,x^3 + x^2 + x + 3}{10\,x^3 + 10\,x^2 + 5\,x + 5}$$

$$SSS :=, [0.4042380413]$$

$Orb =, [0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416,$
0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416,
0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416,
0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416]

$$x0 = , -10.1$$

$$f =, \frac{4\,x^3 + 8\,x^2 + 2\,x + 10}{9\,x^3 + 5\,x^2 + 9\,x + 2}$$

$$SSS :=, [0.9747201978]$$

$Orb =, [0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986,$
0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986,
0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986,
0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986]

$$x0 = , -10.1$$

$$f =, \frac{10 x^3 + 3 x^2 + 4 x + 7}{9 x^3 + 4 x^2 + 10 x + 9}$$

$$SSS :=, [0.6982012560]$$

$$Orb =, [0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562]$$

$$x0 = , -10.1$$

$$f =, \frac{x^3 + 9 x^2 + 8 x + 7}{7 x^3 + 4 x^2 + 2 x + 10}$$

$$SSS :=, [1.070745313]$$

$$Orb =, [1.070745313, 1.070745313]$$

$$x0 = , -10.1$$

$$f =, \frac{4 x^3 + 6 x^2 + x + 8}{9 x^3 + 2 x^2 + 7 x + 1}$$

$$SSS :=, [1.]$$

$$Orb =, [1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001]$$

$$x0 = , -10.1$$

$$f =, \frac{4 x^3 + 9 x^2 + 9 x + 5}{4 x^3 + 6 x^2 + 4 x + 3}$$

$$SSS :=, [1.460448809]$$

$$Orb =, [1.460448809, 1.460448809]$$

$$x0 = , -10.1$$

$$f =, \frac{2x^3 + 8x^2 + 10x + 4}{3x^3 + 5x^2 + 2x + 7}$$

$$SSS :=, [1.406545762]$$

$$Orb =, [1.406545762, 1.406545762]$$

$$x0 =, -10.1$$

$$f =, \frac{4x^3 + 5x^2 + 7x + 5}{2x^3 + 10x^2 + 8x + 6}$$

$$SSS :=, [0.7994227258]$$

$$Orb =, [0.7994227260, 0.7994227260]$$

$$x0 =, -10.1$$

$$f =, \frac{8x^3 + 4x^2 + 8x + 6}{10x^3 + 4x^2 + 9x + 7}$$

$$SSS :=, [0.8696205581]$$

$$Orb =, [0.8696205577, 0.8696205577]$$

$$x0 =, -10.1$$

$$f =, \frac{x^3 + 9x^2 + 2x + 3}{4x^3 + 2x^2 + 5x + 1}$$

$$SSS :=, [1.197066008, -1.260488554]$$

$$Orb =, [1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007]$$

$$x0 =, 10.1$$

$$f =, \frac{3x^3 + 3x^2 + 7x + 7}{10x^3 + 8x^2 + 3x + 5}$$

$$SSS :=, [0.8620096788]$$

$Orb =, [0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794]$

$$x0 =, 10.1$$

$$f =, \frac{3x^3 + x^2 + x + 3}{10x^3 + 10x^2 + 5x + 5}$$

$$SSS :=, [0.4042380413]$$

$Orb =, [0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416]$

$$x0 =, 10.1$$

$$f =, \frac{4x^3 + 8x^2 + 2x + 10}{9x^3 + 5x^2 + 9x + 2}$$

$$SSS :=, [0.9747201978]$$

$Orb =, [0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986, 0.9747201970, 0.9747201986]$

$$x0 =, 10.1$$

$$f =, \frac{10x^3 + 3x^2 + 4x + 7}{9x^3 + 4x^2 + 10x + 9}$$

$$SSS :=, [0.6982012560]$$

$Orb =, [0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559]$

$$x0 =, 10.1$$

$$f =, \frac{x^3 + 9\,x^2 + 8\,x + 7}{7\,x^3 + 4\,x^2 + 2\,x + 10}$$

$$SSS :=, [1.070745313]$$

$Orb =, [1.070745313, 1.070745313]$

$$x0 =, 10.1$$

$$f =, \frac{4\,x^3 + 6\,x^2 + x + 8}{9\,x^3 + 2\,x^2 + 7\,x + 1}$$

$$SSS :=, [1.]$$

$Orb =, [1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001]$

$$x0 =, 10.1$$

$$f =, \frac{4\,x^3 + 9\,x^2 + 9\,x + 5}{4\,x^3 + 6\,x^2 + 4\,x + 3}$$

$$SSS :=, [1.460448809]$$

$Orb =, [1.460448809, 1.460448809]$

$$x0 =, 10.1$$

$$f =, \frac{2\,x^3 + 8\,x^2 + 10\,x + 4}{3\,x^3 + 5\,x^2 + 2\,x + 7}$$

$$SSS :=, [1.406545762]$$

$Orb =, [1.406545762, 1.406545762]$

$$x0 =, 10.1$$

$$f =, \frac{4x^3 + 5x^2 + 7x + 5}{2x^3 + 10x^2 + 8x + 6}$$

$$SSS :=, [0.7994227258]$$

$Orb =, [0.7994227260, 0.7994227260]$

$$x0 =, 10.1$$

$$f =, \frac{8x^3 + 4x^2 + 8x + 6}{10x^3 + 4x^2 + 9x + 7}$$

$$SSS :=, [0.8696205581]$$

$Orb =, [0.8696205577, 0.8696205577]$

$$x0 =, 10.1$$

$$f =, \frac{x^3 + 9x^2 + 2x + 3}{4x^3 + 2x^2 + 5x + 1}$$

$$SSS :=, [1.197066008, -1.260488554]$$

$Orb =, [1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008]$

$$x0 =, 100.1$$

$$f =, \frac{3x^3 + 3x^2 + 7x + 7}{10x^3 + 8x^2 + 3x + 5}$$

$$SSS :=, [0.8620096788]$$

$Orb =, [0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794, 0.8620096783, 0.8620096794]$

$$x0 =, 100.1$$

$$f =, \frac{3x^3 + x^2 + x + 3}{10x^3 + 10x^2 + 5x + 5}$$

$$SSS :=, [0.4042380413]$$

$Orb =, [0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416, 0.4042380414, 0.4042380416]$

$$x0 =, 100.1$$

$$f =, \frac{4x^3 + 8x^2 + 2x + 10}{9x^3 + 5x^2 + 9x + 2}$$

$$SSS :=, [0.9747201978]$$

$Orb =, [0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982, 0.9747201978, 0.9747201982]$

$$x0 =, 100.1$$

$$f =, \frac{10x^3 + 3x^2 + 4x + 7}{9x^3 + 4x^2 + 10x + 9}$$

$$SSS :=, [0.6982012560]$$

$Orb =, [0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562, 0.6982012559, 0.6982012561, 0.6982012562]$

$$x0 =, 100.1$$

$$f =, \frac{x^3 + 9x^2 + 8x + 7}{7x^3 + 4x^2 + 2x + 10}$$

$$SSS :=, [1.070745313]$$

$Orb =, [1.070745313, 1.070745313]$

$$x0 =, 100.1$$

$$f =, \frac{4x^3 + 6x^2 + x + 8}{9x^3 + 2x^2 + 7x + 1}$$

$$SSS :=, [1.]$$

$$Orb =, [1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001, 0.9999999989, 1.000000001]$$

$$x0 =, 100.1$$

$$f =, \frac{4x^3 + 9x^2 + 9x + 5}{4x^3 + 6x^2 + 4x + 3}$$

$$SSS :=, [1.460448809]$$

$$Orb =, [1.460448809, 1.460448809]$$

$$x0 =, 100.1$$

$$f =, \frac{2x^3 + 8x^2 + 10x + 4}{3x^3 + 5x^2 + 2x + 7}$$

$$SSS :=, [1.406545762]$$

$$Orb =, [1.406545762, 1.406545762]$$

$$x0 =, 100.1$$

$$f =, \frac{4x^3 + 5x^2 + 7x + 5}{2x^3 + 10x^2 + 8x + 6}$$

$$SSS :=, [0.7994227258]$$

$$Orb =, [0.7994227260, 0.7994227260]$$

$$x0 =, 100.1$$

$$f =, \frac{8x^3 + 4x^2 + 8x + 6}{10x^3 + 4x^2 + 9x + 7}$$

$$SSS :=, [0.8696205581]$$

Orb =, [0.8696205577, 0.8696205577]

$$x0 = , 100.1$$

$$f =, \frac{x^3 + 9x^2 + 2x + 3}{4x^3 + 2x^2 + 5x + 1}$$

$$SSS :=, [1.197066008, -1.260488554]$$

Orb =, [1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008, 1.197066007, 1.197066008] **(3)**

```
> for k in {1, 2, 2.5, 3.1, 3.2, 3.3, 3.5} do
    f := k·x·(1 − x);
    print(`k =`, k, `orbit = `, Orb(f, x, 0.5, 200, 230)); end:
```

k =, 1, *orbit* = , [0.004828613965, 0.004805298452, 0.004782207559, 0.004759338050, 0.004736686752, 0.004714250550, 0.004692026392, 0.004670011280, 0.004648202275, 0.004626596490, 0.004605191095, 0.004583983310, 0.004562970407, 0.004542149708, 0.004521518584, 0.004501074454, 0.004480814783, 0.004460737082, 0.004440838907, 0.004421117857, 0.004401571574, 0.004382197742, 0.004362994085, 0.004343958368, 0.004325088394, 0.004306382004, 0.004287837078, 0.004269451531, 0.004251223315, 0.004233150415, 0.004215230853]

k =, 2, *orbit* = , [0.5000000000, 0.5000000000]

k =, 2.5, *orbit* = , [0.6000000000, 0.6000000000,

0.6000000000, 0.6000000000, 0.6000000000, 0.6000000000, 0.6000000000, 0.6000000000, 0.6000000000, 0.6000000000, 0.6000000000, 0.6000000000, 0.6000000000, 0.6000000000, 0.6000000000, 0.6000000000]

k =, 3.1, *orbit* = , [0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245, 0.7645665203, 0.5580141245]

k =, 3.2, *orbit* = , [0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091, 0.7994554906, 0.5130445091]

k =, 3.3, *orbit* = , [0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198, 0.8236032832, 0.4794270198]

k =, 3.5, *orbit* = , [0.5008842111, 0.8749972637, 0.3828196827, 0.8269407062, 0.5008842111, 0.8749972637, 0.3828196827, 0.8269407062, 0.5008842111, 0.8749972637, 0.3828196827, 0.8269407062, 0.5008842111, 0.8749972637, 0.3828196827, 0.8269407062, 0.5008842111, 0.8749972637, 0.3828196827, 0.8269407062, 0.5008842111, 0.8749972637, 0.3828196827, 0.8269407062, 0.5008842111, 0.8749972637, 0.3828196827, 0.8269407062, 0.5008842111, 0.8749972637, 0.3828196827] **(4)**

> `2000 to 2030 was too much for maple!`

2000 to 2030 was too much for maple! **(5)**

> `for 1..2.5 it was stable, but at 3..3.3 it alternated between 2 states and at 3.5 it alternated between 3 states`

for 1..2.5 it was stable, but at 3..3.3 it alternated between 2 states and at 3.5 it alternated between 3 states **(6)**

> **for** k **from** 355 **to** 400 **do** $f := MakeNicePol([1, 2, 3, 4, 5, 6, 7, 8], k, x) : sss := evalf(SSS(f,$

```
    x) ) : if nops(sss) > 1 then print(k,f, sss); break; end end:
```

$$361,\ \frac{1}{361}x^9-\frac{36}{361}x^8+\frac{546}{361}x^7-\frac{4536}{361}x^6+\frac{22449}{361}x^5-\frac{67284}{361}x^4+\frac{118124}{361}x^3-\frac{109584}{361}x^2+\frac{40681}{361}x,\ [3.,\ 5.] \tag{7}$$

```
> `361 is the smallest k value with 2 stable steady states`
```

361 is the smallest k value with 2 stable steady states (8)

```
> Orb(MakeNicePol([1, 2, 3, 4, 5, 6, 7, 8], 361, x), x, 5.4, 10, 15)
```

$$[5.0921758,\ 4.9027934,\ 5.0858549,\ 4.9096827,\ 5.0807794,\ 4.9153429] \tag{9}$$

```
> for k from 2500 to 10000 do f := MakeNicePol([1, 2, 3, 4, 5, 6, 7, 8], k, x) : sss :=
    evalf(SSS(f, x)) : if nops(sss) > 3 then print(k,f, sss); break; end end:
```

$$2521,\ \frac{1}{2521}x^9-\frac{36}{2521}x^8+\frac{546}{2521}x^7-\frac{4536}{2521}x^6+\frac{22449}{2521}x^5-\frac{67284}{2521}x^4+\frac{118124}{2521}x^3-\frac{109584}{2521}x^2+\frac{42841}{2521}x,\ [1.,\ 3.,\ 5.,\ 7.] \tag{10}$$

```
> Orb(MakeNicePol([1, 2, 3, 4, 5, 6, 7, 8], 2521, x), x, 6.8, 10, 15)
```

$$[6.9403929,\ 7.0482248,\ 6.9442747,\ 7.0458398,\ 6.9475589,\ 7.0436533] \tag{11}$$

```
> `looks good to me!`
```