> *#OK to post homework*

> *#Shreya Ghosh, 10-18-2021, Assignment 13*

> **read** "/Users/shreyaghosh/Documents/M13.txt"

> *Help13( )*

$$RT2(x,y,d,K),\ Orb2(F,x,y,pt0,K1,K2),\ FP2(F,x,y),\ SFP2(F,x,y)\tag{1}$$

> *Help9( )*

$$Orb(f,x,x0,K1,K2),\ Orb2D(f,x,x0,K),\ FP(f,x),\ SFP(f,x),\ Comp(f,x)\tag{2}$$

> *#2.*

$$F := \left[\ \frac{x^2 + 8\cdot x + 5}{x^2},\ \frac{2\cdot x^2 + 8\cdot x + 5}{5\cdot x^2 + 5}\ \right]$$

$$F := \left[\ \frac{x^2 + 8x + 5}{x^2},\ \frac{2x^2 + 8x + 5}{5x^2 + 5}\ \right]\tag{3}$$

> *evalf* $(FP2(F, x, y))$

$$[\,[\,3.604383935,\ 0.8550603063\,]\,]\tag{4}$$

> *evalf* $(SFP2(F, x, y))$

$$[\,[\,3.604383935,\ 0.8550603063\,]\,]\tag{5}$$

> *Orb2* $(F, x, y, [8.5, 5], 1000, 1010)$

$[\,[\,3.604383934, 0.8550603060\,], [\,3.604383935, 0.8550603068\,], [\,3.604383936, 0.8550603063\,],$ **(6)**
$\quad [\,3.604383934, 0.8550603060\,], [\,3.604383935, 0.8550603068\,], [\,3.604383936,$
$\quad 0.8550603063\,], [\,3.604383934, 0.8550603060\,], [\,3.604383935, 0.8550603068\,],$
$\quad [\,3.604383936, 0.8550603063\,], [\,3.604383934, 0.8550603060\,]\,]$

>

> *#3.*

> $n := 0 :$

> **do**
    $RT2(x, y, 1, 100);$
    $n := n + 1 :$
    until $n = 20;$

$$\left[\ \frac{74 + 90\,y + 74\,x}{27 + 98\,y + 72\,x},\ \frac{2 + 73\,y + 85\,x}{41 + 4\,y + 44\,x}\ \right]$$

$$n := 1$$

$$\left[\ \frac{13 + 19\,y + 10\,x}{15 + 64\,y + 9\,x},\ \frac{12 + 52\,y + 25\,x}{72 + 90\,y + 18\,x}\ \right]$$

$$n := 2$$

$$\left[\ \frac{43 + 55\,y + 40\,x}{17 + 70\,y + 52\,x},\ \frac{81 + 87\,y + 34\,x}{85 + 9\,y + 68\,x}\ \right]$$

$$n := 3$$

$$\left[\ \frac{83 + 63\,y + 100\,x}{70 + 36\,y + 36\,x},\ \frac{10 + 40\,y + 66\,x}{87 + 16\,y + 98\,x}\ \right]$$

$$n := 4$$

$$\left[\frac{43 + 53\,y + 61\,x}{47 + 28\,y + 75\,x}, \frac{3 + 5\,y + 11\,x}{37 + 75\,y + 4\,x} \right]$$

$$n := 5$$

$$\left[\frac{91 + 22\,y + 40\,x}{58 + 93\,y + 98\,x}, \frac{11 + 30\,y + 6\,x}{32 + 40\,y + 24\,x} \right]$$

$$n := 6$$

$$\left[\frac{80 + 96\,y + 11\,x}{23 + 41\,y + 52\,x}, \frac{58 + 67\,y + 81\,x}{65 + 69\,y + 2\,x} \right]$$

$$n := 7$$

$$\left[\frac{36 + 61\,y + 84\,x}{96 + 94\,y + 31\,x}, \frac{81 + 31\,y + 54\,x}{67 + 59\,y + 66\,x} \right]$$

$$n := 8$$

$$\left[\frac{12 + 49\,y + 90\,x}{35 + 15\,y + 26\,x}, \frac{100 + 24\,y + 8\,x}{63 + 78\,y + 23\,x} \right]$$

$$n := 9$$

$$\left[\frac{73 + 22\,y + 32\,x}{98 + 9\,y + 53\,x}, \frac{3 + 98\,y + 69\,x}{3 + 73\,y + 88\,x} \right]$$

$$n := 10$$

$$\left[\frac{37 + 60\,y + 94\,x}{52 + 16\,y + 29\,x}, \frac{51 + 3\,y + 45\,x}{67 + 40\,y + 71\,x} \right]$$

$$n := 11$$

$$\left[\frac{74 + 49\,y + 60\,x}{69 + 33\,y + 30\,x}, \frac{1 + 83\,y + 9\,x}{64 + 43\,y + 57\,x} \right]$$

$$n := 12$$

$$\left[\frac{52 + 62\,y + 46\,x}{76 + 9\,y + 53\,x}, \frac{37 + 88\,y + 50\,x}{37 + 76\,y + 95\,x} \right]$$

$$n := 13$$

$$\left[\frac{8 + 92\,y + 92\,x}{2 + 97\,y + 44\,x}, \frac{9 + 30\,y + 14\,x}{79 + 73\,y + 21\,x} \right]$$

$$n := 14$$

$$\left[\frac{78 + 49\,y + 93\,x}{15 + 56\,y + 69\,x}, \frac{17 + 21\,y + 42\,x}{21 + 5\,y + 58\,x} \right]$$

$$n := 15$$

$$\left[\frac{3 + 86\,y + 55\,x}{97 + 4\,y + 92\,x}, \frac{46 + 88\,y + 34\,x}{68 + 49\,y + 61\,x} \right]$$

$$n := 16$$

$$\left[\frac{21 + 86\,y + 42\,x}{5 + 33\,y + 77\,x}, \frac{98 + 58\,y + 98\,x}{29 + 65\,y + 29\,x} \right]$$

$$n := 17$$

$$\left[\frac{35 + 29\,y + 34\,x}{66 + 44\,y + 60\,x}, \frac{83 + 32\,y + 85\,x}{100 + 68\,y + 59\,x} \right]$$

$$n := 18$$

$$\left[\frac{40 + 76\,y + 92\,x}{39 + 17\,y + 50\,x}, \frac{78 + 20\,y + 18\,x}{18 + 51\,y + 34\,x} \right]$$

$$n := 19$$

$$\left[\frac{78 + 10\,y + 52\,x}{100 + 13\,y + 87\,x}, \frac{13 + 37\,y + 92\,x}{97 + 69\,y + 62\,x} \right]$$

$$n := 20 \qquad\qquad (7)$$

> $SFP2\left(\left[\dfrac{74 + 90\,y + 74\,x}{27 + 98\,y + 72\,x}, \dfrac{2 + 73\,y + 85\,x}{41 + 4\,y + 44\,x} \right], x, y \right)$

> $SFP2\left(\left[\dfrac{13 + 19\,y + 10\,x}{15 + 64\,y + 9\,x}, \dfrac{12 + 52\,y + 25\,x}{72 + 90\,y + 18\,x} \right], x, y \right)$

$$[\,[\,0.5763212698, 0.3986163086\,]\,] \qquad\qquad (8)$$

> $Orb2\left(\left[\dfrac{13 + 19\,y + 10\,x}{15 + 64\,y + 9\,x}, \dfrac{12 + 52\,y + 25\,x}{72 + 90\,y + 18\,x} \right], x, y, [2.5, 1.5], 1000, 1010 \right)$

$[\,[\,0.5763212700, 0.3986163084\,], [0.5763212700, 0.3986163084\,], [0.5763212700,$ **(9)**
    $0.3986163084\,], [0.5763212700, 0.3986163084\,], [0.5763212700, 0.3986163084\,],$
    $[0.5763212700, 0.3986163084\,], [0.5763212700, 0.3986163084\,], [0.5763212700,$
    $0.3986163084\,], [0.5763212700, 0.3986163084\,], [0.5763212700, 0.3986163084\,]\,]$

> $SFP2\left(\left[\dfrac{43 + 55\,y + 40\,x}{17 + 70\,y + 52\,x}, \dfrac{81 + 87\,y + 34\,x}{85 + 9\,y + 68\,x} \right], x, y \right)$

$$[\,[\,0.9545434862, 1.487092984\,]\,] \qquad\qquad (10)$$

> $Orb2\left(\left[\dfrac{43 + 55\,y + 40\,x}{17 + 70\,y + 52\,x}, \dfrac{81 + 87\,y + 34\,x}{85 + 9\,y + 68\,x} \right], x, y, [2.5, 1.5], 1000, 1010 \right)$

$[\,[\,0.9545434857, 1.487092982\,], [0.9545434857, 1.487092982\,], [0.9545434857, 1.487092982\,],$ **(11)**
    $[0.9545434857, 1.487092982\,], [0.9545434857, 1.487092982\,], [0.9545434857,$
    $1.487092982\,], [0.9545434857, 1.487092982\,], [0.9545434857, 1.487092982\,],$
    $[0.9545434857, 1.487092982\,], [0.9545434857, 1.487092982\,]\,]$

> $SFP2\left(\left[\dfrac{83 + 63\,y + 100\,x}{70 + 36\,y + 36\,x}, \dfrac{10 + 40\,y + 66\,x}{87 + 16\,y + 98\,x} \right], x, y \right)$

$$[\,[\,1.954335211, 0.5615386142\,]\,] \qquad\qquad (12)$$

> $Orb2\left(\left[\dfrac{83 + 63\,y + 100\,x}{70 + 36\,y + 36\,x}, \dfrac{10 + 40\,y + 66\,x}{87 + 16\,y + 98\,x} \right], x, y, [2.5, 1.5], 1000, 1010 \right)$

$[\,[\,1.954335212, 0.5615386143\,], [1.954335212, 0.5615386143\,], [1.954335212, 0.5615386143\,],$ **(13)**
    $[1.954335212, 0.5615386143\,], [1.954335212, 0.5615386143\,], [1.954335212,$
    $0.5615386143\,], [1.954335212, 0.5615386143\,], [1.954335212, 0.5615386143\,],$
    $[1.954335212, 0.5615386143\,], [1.954335212, 0.5615386143\,]\,]$

> $SFP2\left(\left[\dfrac{43 + 53\,y + 61\,x}{47 + 28\,y + 75\,x}, \dfrac{3 + 5\,y + 11\,x}{37 + 75\,y + 4\,x} \right], x, y \right)$

$$[[0.9123053419, 0.2422215939]] \tag{14}$$

> $Orb2\left(\left[\dfrac{43 + 53\,y + 61\,x}{47 + 28\,y + 75\,x}, \dfrac{3 + 5\,y + 11\,x}{37 + 75\,y + 4\,x}\right], x, y, [2.5, 1.5], 1000, 1010\right)$

$$[[0.9123053421, 0.2422215937], [0.9123053413, 0.2422215939], [0.9123053421, \tag{15}$$
$$0.2422215937], [0.9123053413, 0.2422215939], [0.9123053421, 0.2422215937],$$
$$[0.9123053413, 0.2422215939], [0.9123053421, 0.2422215937], [0.9123053413,$$
$$0.2422215939], [0.9123053421, 0.2422215937], [0.9123053413, 0.2422215939]]$$

> $SFP2\left(\left[\dfrac{91 + 22\,y + 40\,x}{58 + 93\,y + 98\,x}, \dfrac{11 + 30\,y + 6\,x}{32 + 40\,y + 24\,x}\right], x, y\right)$

$$[[0.7613173482, 0.4199596291]] \tag{16}$$

> $Orb2\left(\left[\dfrac{91 + 22\,y + 40\,x}{58 + 93\,y + 98\,x}, \dfrac{11 + 30\,y + 6\,x}{32 + 40\,y + 24\,x}\right], x, y, [2.5, 1.5], 1000, 1010\right)$

$$[[0.7613173483, 0.4199596292], [0.7613173483, 0.4199596292], [0.7613173483, \tag{17}$$
$$0.4199596292], [0.7613173483, 0.4199596292], [0.7613173483, 0.4199596292],$$
$$[0.7613173483, 0.4199596292], [0.7613173483, 0.4199596292], [0.7613173483,$$
$$0.4199596292], [0.7613173483, 0.4199596292], [0.7613173483, 0.4199596292]]$$

> $SFP2\left(\left[\dfrac{80 + 96\,y + 11\,x}{23 + 41\,y + 52\,x}, \dfrac{58 + 67\,y + 81\,x}{65 + 69\,y + 2\,x}\right], x, y\right)$

$$[[1.501783006, 1.606293788]] \tag{18}$$

> $Orb2\left(\left[\dfrac{80 + 96\,y + 11\,x}{23 + 41\,y + 52\,x}, \dfrac{58 + 67\,y + 81\,x}{65 + 69\,y + 2\,x}\right], x, y, [2.5, 1.5], 1000, 1010\right)$

$$[[1.501783006, 1.606293789], [1.501783006, 1.606293789], [1.501783006, 1.606293789], \tag{19}$$
$$[1.501783006, 1.606293789], [1.501783006, 1.606293789], [1.501783006, 1.606293789],$$
$$[1.501783006, 1.606293789], [1.501783006, 1.606293789], [1.501783006, 1.606293789],$$
$$[1.501783006, 1.606293789]]$$

> $SFP2\left(\left[\dfrac{36 + 61\,y + 84\,x}{96 + 94\,y + 31\,x}, \dfrac{81 + 31\,y + 54\,x}{67 + 59\,y + 66\,x}\right], x, y\right)$

> $SFP2\left(\left[\dfrac{12 + 49\,y + 90\,x}{35 + 15\,y + 26\,x}, \dfrac{100 + 24\,y + 8\,x}{63 + 78\,y + 23\,x}\right], x, y\right)$

$$[[2.451345827, 0.7696344406]] \tag{20}$$

> $Orb2\left(\left[\dfrac{12 + 49\,y + 90\,x}{35 + 15\,y + 26\,x}, \dfrac{100 + 24\,y + 8\,x}{63 + 78\,y + 23\,x}\right], x, y, [2.5, 1.5], 1000, 1010\right)$

$$[[2.451345827, 0.7696344406], [2.451345827, 0.7696344406], [2.451345827, 0.7696344406], \tag{21}$$
$$[2.451345827, 0.7696344406], [2.451345827, 0.7696344406], [2.451345827,$$
$$0.7696344406], [2.451345827, 0.7696344406], [2.451345827, 0.7696344406],$$
$$[2.451345827, 0.7696344406], [2.451345827, 0.7696344406]]$$

> $SFP2\left(\left[\dfrac{73 + 22\,y + 32\,x}{98 + 9\,y + 53\,x}, \dfrac{3 + 98\,y + 69\,x}{3 + 73\,y + 88\,x}\right], x, y\right)$

> $SFP2\left(\left[\dfrac{37 + 60\,y + 94\,x}{52 + 16\,y + 29\,x}, \dfrac{51 + 3\,y + 45\,x}{67 + 40\,y + 71\,x}\right], x, y\right)$

> $SFP2\left(\left[\dfrac{74 + 49\,y + 60\,x}{69 + 33\,y + 30\,x},\ \dfrac{1 + 83\,y + 9\,x}{64 + 43\,y + 57\,x}\right], x, y\right)$

> $SFP2\left(\left[\dfrac{52 + 62\,y + 46\,x}{76 + 9\,y + 53\,x},\ \dfrac{37 + 88\,y + 50\,x}{37 + 76\,y + 95\,x}\right], x, y\right)$

> $SFP2\left(\left[\dfrac{8 + 92\,y + 92\,x}{2 + 97\,y + 44\,x},\ \dfrac{9 + 30\,y + 14\,x}{79 + 73\,y + 21\,x}\right], x, y\right)$

> $SFP2\left(\left[\dfrac{78 + 49\,y + 93\,x}{15 + 56\,y + 69\,x},\ \dfrac{17 + 21\,y + 42\,x}{21 + 5\,y + 58\,x}\right], x, y\right)$

> $SFP2\left(\left[\dfrac{3 + 86\,y + 55\,x}{97 + 4\,y + 92\,x},\ \dfrac{46 + 88\,y + 34\,x}{68 + 49\,y + 61\,x}\right], x, y\right)$

$$[[0.7527147520, 0.9728903376]] \tag{22}$$

> $Orb2\left(\left[\dfrac{3 + 86\,y + 55\,x}{97 + 4\,y + 92\,x},\ \dfrac{46 + 88\,y + 34\,x}{68 + 49\,y + 61\,x}\right], x, y, [2.5, 1.5], 1000, 1010\right)$

$[[0.7527147518, 0.9728903373], [0.7527147522, 0.9728903379], [0.7527147518,$ $\qquad$ (23)
$\quad 0.9728903373], [0.7527147522, 0.9728903379], [0.7527147518, 0.9728903373],$
$\quad [0.7527147522, 0.9728903379], [0.7527147518, 0.9728903373], [0.7527147522,$
$\quad 0.9728903379], [0.7527147518, 0.9728903373], [0.7527147522, 0.9728903379]]$

> $SFP2\left(\left[\dfrac{21 + 86\,y + 42\,x}{5 + 33\,y + 77\,x},\ \dfrac{98 + 58\,y + 98\,x}{29 + 65\,y + 29\,x}\right], x, y\right)$

> $SFP2\left(\left[\dfrac{35 + 29\,y + 34\,x}{66 + 44\,y + 60\,x},\ \dfrac{83 + 32\,y + 85\,x}{100 + 68\,y + 59\,x}\right], x, y\right)$

$$[[0.5738382141, 0.8318160241]] \tag{24}$$

> $Orb2\left(\left[\dfrac{35 + 29\,y + 34\,x}{66 + 44\,y + 60\,x},\ \dfrac{83 + 32\,y + 85\,x}{100 + 68\,y + 59\,x}\right], x, y, [2.5, 1.5], 1000, 1010\right)$

$[[0.5738382136, 0.8318160247], [0.5738382137, 0.8318160242], [0.5738382136,$ $\qquad$ (25)
$\quad 0.8318160247], [0.5738382137, 0.8318160242], [0.5738382136, 0.8318160247],$
$\quad [0.5738382137, 0.8318160242], [0.5738382136, 0.8318160247], [0.5738382137,$
$\quad 0.8318160242], [0.5738382136, 0.8318160247], [0.5738382137, 0.8318160242]]$

> $SFP2\left(\left[\dfrac{40 + 76\,y + 92\,x}{39 + 17\,y + 50\,x},\ \dfrac{78 + 20\,y + 18\,x}{18 + 51\,y + 34\,x}\right], x, y\right)$

$$[[1.922169930, 0.9893531309]] \tag{26}$$

> $Orb2\left(\left[\dfrac{40 + 76\,y + 92\,x}{39 + 17\,y + 50\,x},\ \dfrac{78 + 20\,y + 18\,x}{18 + 51\,y + 34\,x}\right], x, y, [2.5, 1.5], 1000, 1010\right)$

$[[1.922169930, 0.9893531312], [1.922169931, 0.9893531312], [1.922169930, 0.9893531312],$ (27)
$\quad [1.922169931, 0.9893531312], [1.922169930, 0.9893531312], [1.922169931,$
$\quad 0.9893531312], [1.922169930, 0.9893531312], [1.922169931, 0.9893531312],$
$\quad [1.922169930, 0.9893531312], [1.922169931, 0.9893531312]]$

> $SFP2\left(\left[\dfrac{78 + 10\,y + 52\,x}{100 + 13\,y + 87\,x},\ \dfrac{13 + 37\,y + 92\,x}{97 + 69\,y + 62\,x}\right], x, y\right)$

$$[[0.7127296415, 0.5521890015]] \tag{28}$$

```
> Orb2([ (78 + 10 y + 52 x)/(100 + 13 y + 87 x), (13 + 37 y + 92 x)/(97 + 69 y + 62 x) ], x, y, [2.5, 1.5], 1000, 1010)
```

$$[[0.7127296417, 0.5521890016], [0.7127296417, 0.5521890016], [0.7127296417, \quad (29)$$
$$0.5521890016], [0.7127296417, 0.5521890016], [0.7127296417, 0.5521890016],$$
$$[0.7127296417, 0.5521890016], [0.7127296417, 0.5521890016], [0.7127296417,$$
$$0.5521890016], [0.7127296417, 0.5521890016], [0.7127296417, 0.5521890016]]$$

```
> 
> #4i.
  RT3 := proc(x, y, z, d, K) local ra, i, j, k, f, g, h :
  ra := rand(1 ..K) : #random integer from -K to K
```

$$f := add\left(add\left(add\left(ra(\ )\cdot x^i\cdot y^j\cdot z^k, k=0..d-j-i\right), j=0..d-i\right), i=0..d\right)$$
$$/add\left(add\left(add\left(ra(\ )\cdot x^i\cdot y^j\cdot z^k, k=0..d-j-i\right), j=0..d-i\right), i=0..d\right) :$$
$$g := add\left(add\left(add\left(ra(\ )\cdot x^i\cdot y^j\cdot z^k, k=0..d-j-i\right), j=0..d-i\right), i=0..d\right)$$
$$/add\left(add\left(add\left(ra(\ )\cdot x^i\cdot y^j\cdot z^k, k=0..d-j-i\right), j=0..d-i\right), i=0..d\right) :$$
$$h := \frac{add\left(add\left(add\left(ra(\ )\cdot x^i\cdot y^j\cdot z^k, k=0..d-j-i\right), j=0..d-i\right), i=0..d\right)}{add\left(add\left(add\left(ra(\ )\cdot x^i\cdot y^j\cdot z^k, k=0..d-j-i\right), j=0..d-i\right), i=0..d\right)} :$$

```
  [f, g, h] :
  end:
> RT3(x, y, z, 1, 100)
```

$$\left[\frac{2 + 74 z + 16 y + 13 x}{82 + 35 z + 80 y + 45 x}, \frac{83 + 36 z + 38 y + 14 x}{39 + 85 z + 50 y + 10 x}, \frac{37 + 61 z + 2 y + 58 x}{3 + 77 z + 22 y + 57 x} \right] \quad (30)$$

```
> #4ii.
  Orb3 := proc(F, x, y, z, pt0, K1, K2)  local pt, L, i :
  pt := pt0 :

  for i from 1 to K1 do
  pt := subs({x = pt[1], y = pt[2], z = pt[3]}, F) :
  od:

  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) :

  od:
  L :
  end:
```

```
> Orb3([ (2 + 74 z + 16 y + 13 x)/(82 + 35 z + 80 y + 45 x), (83 + 36 z + 38 y + 14 x)/(39 + 85 z + 50 y + 10 x), (37 + 61 z + 2 y + 58 x)/(3 + 77 z + 22 y + 57 x) ], x, y,
      z, [1.5, 1.3, 1.2], 1000, 1010)
```

$$[[0.4580256140, 0.9185354898, 1.000613335], [0.4580256145, 0.9185354898, 1.000613334], \quad (31)$$
$$[0.4580256140, 0.9185354898, 1.000613335], [0.4580256145, 0.9185354898,$$
$$1.000613334], [0.4580256140, 0.9185354898, 1.000613335], [0.4580256145,$$

$$0.9185354898, 1.000613334\,], [\,0.4580256140, 0.9185354898, 1.000613335\,],$$
$$[\,0.4580256145, 0.9185354898, 1.000613334\,], [\,0.4580256140, 0.9185354898,$$
$$1.000613335\,], [\,0.4580256145, 0.9185354898, 1.000613334\,]]$$

> *#4iv.*
```
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:
```

> $evalf\left(FP3\left(\left[\dfrac{2 + 74\,z + 16\,y + 13\,x}{82 + 35\,z + 80\,y + 45\,x}, \ \dfrac{83 + 36\,z + 38\,y + 14\,x}{39 + 85\,z + 50\,y + 10\,x}, \ \dfrac{37 + 61\,z + 2\,y + 58\,x}{3 + 77\,z + 22\,y + 57\,x} \right],\right.\right.$
$\left.\left. x, y, z \right)\right)$

$$[[\,0.4580256143, 0.918535488, 1.000613336\,]] \tag{32}$$

> *#4v.*
```
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 from 1 to nops(L) do   #we examime it case by case
pt := L[i] :

J0 := subs({x = pt[1], y = pt[2], z = pt[3]}, J) :

EV := Eigenvalues(J0) :

if abs(EV[1]) < 1 and abs(EV[2]) < 1  and abs(EV[3]) < 1 then
S := [op(S), pt] :
fi:

od:
S :
end:
```

> $SFP3\left(\left[\dfrac{2 + 74\,z + 16\,y + 13\,x}{82 + 35\,z + 80\,y + 45\,x}, \ \dfrac{83 + 36\,z + 38\,y + 14\,x}{39 + 85\,z + 50\,y + 10\,x}, \ \dfrac{37 + 61\,z + 2\,y + 58\,x}{3 + 77\,z + 22\,y + 57\,x} \right], x, y,\right.$
$\left. z \right)$

$$[[\,0.4580256143, 0.918535488, 1.000613336\,]] \tag{33}$$

> *#5.*
```
RT3(x, y, z, 1, 100)
```

$$\left[\frac{99 + 51\,z + 47\,y + 33\,x}{77 + 20\,z + 83\,y + 10\,x}, \frac{40 + 16\,z + 19\,y + 40\,x}{40 + 78\,z + 91\,y + 71\,x}, \frac{75 + 5\,z + 78\,y + 29\,x}{23 + 81\,z + 21\,y + 6\,x} \right] \tag{34}$$

> $SFP3\left(\left[\dfrac{99 + 51\,z + 47\,y + 33\,x}{77 + 20\,z + 83\,y + 10\,x}, \dfrac{40 + 16\,z + 19\,y + 40\,x}{40 + 78\,z + 91\,y + 71\,x}, \dfrac{75 + 5\,z + 78\,y + 29\,x}{23 + 81\,z + 21\,y + 6\,x} \right], x, y,\right.$

$\left. z\right)$

$$[[1.49824862, 0.4559974964, 1.17156721]] \tag{35}$$

> $Orb3\left(\left[\dfrac{99 + 51\,z + 47\,y + 33\,x}{77 + 20\,z + 83\,y + 10\,x}, \dfrac{40 + 16\,z + 19\,y + 40\,x}{40 + 78\,z + 91\,y + 71\,x}, \dfrac{75 + 5\,z + 78\,y + 29\,x}{23 + 81\,z + 21\,y + 6\,x} \right], x, y,\right.$

$\left. z, [1.5, 1.2, 1.3], 1000, 1010\right)$

$[[1.498248617, 0.4559974965, 1.171567198], [1.498248617, 0.4559974965, 1.171567198], \tag{36}$
$\quad [1.498248617, 0.4559974965, 1.171567198], [1.498248617, 0.4559974965, 1.171567198],$
$\quad [1.498248617, 0.4559974965, 1.171567198], [1.498248617, 0.4559974965, 1.171567198],$
$\quad [1.498248617, 0.4559974965, 1.171567198], [1.498248617, 0.4559974965, 1.171567198],$
$\quad [1.498248617, 0.4559974965, 1.171567198], [1.498248617, 0.4559974965, 1.171567198]]$

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