> *#OK to post*

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>

> *#Anne Somalwar, hw19, 11.7.2021*

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>

> **read** "C:/Users/aks238/OneDrive - Rutgers University/Documents/M19.txt"

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> *#1*

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> *#(i)*

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> *SIRSdemo*(1000, 200, 3, 1, 0.01, 10)

This is a numerical demonstration of the R0 phenomenon in the SIRS model using discretization

with mesh size=, 0.01, and letting it run until time t=, 10

with population size, 1000, and fixed parameters nu=, 1, and gamma=, 3

where we change beta from 0.2*nu/N to 4*nu/N

Recall that the epidemic will persist if beta exceeds nu/N, that in this case is, $\dfrac{1}{1000}$

We start with , 200, infected individuals, 0 removed and hence, 800, susceptible

We will show what happens once time is close to, 10

beta is, $\dfrac{1}{10}$*, times the threshold value*

the long-term behavior is

$[[9.98, [998.9666995, 0.9909989667]], [9.99, [998.9666995, 0.9909989667]], [10.00,$
$[998.9666995, 0.9909989667]], [10.01, [998.9666995, 0.9909989667]]]$

beta is, $\dfrac{3}{10}$*, times the threshold value*

the long-term behavior is

$[[9.98, [996.7009881, 2.978970309]], [9.99, [996.7009881, 2.978970309]], [10.00,$
$[996.7009881, 2.978970309]], [10.01, [996.7009881, 2.978970309]]]$

beta is, $\dfrac{1}{2}$*, times the threshold value*

the long-term behavior is

$[[9.98, [994.1715221, 4.974854288]], [9.99, [994.1715221, 4.974854288]], [10.00,$

$[994.1715221, 4.974854288]], [10.01, [994.1715221, 4.974854288]]]$

beta is, $\dfrac{7}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [991.3807432, 6.978577656]], [9.99, [991.3807432, 6.978577656]], [10.00,$
$[991.3807432, 6.978577656]], [10.01, [991.3807432, 6.978577656]]]$

beta is, $\dfrac{9}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [988.3315033, 8.990054852]], [9.99, [988.3315033, 8.990054852]], [10.00,$
$[988.3315033, 8.990054852]], [10.01, [988.3315033, 8.990054852]]]$

beta is, $\dfrac{11}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [985.0270559, 11.00918827]], [9.99, [985.0270559, 11.00918827]], [10.00,$
$[985.0270559, 11.00918827]], [10.01, [985.0270559, 11.00918827]]]$

beta is, $\dfrac{13}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [981.4710448, 13.03586861]], [9.99, [981.4710448, 13.03586861]], [10.00,$
$[981.4710448, 13.03586861]], [10.01, [981.4710448, 13.03586861]]]$

beta is, $\dfrac{3}{2}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [977.6674922, 15.06997519]], [9.99, [977.6674922, 15.06997519]], [10.00,$
$[977.6674922, 15.06997519]], [10.01, [977.6674922, 15.06997519]]]$

beta is, $\dfrac{17}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [973.6207848, 17.11137641]], [9.99, [973.6207848, 17.11137641]], [10.00,$
$[973.6207848, 17.11137641]], [10.01, [973.6207848, 17.11137641]]]$

beta is, $\dfrac{19}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [969.3356593, 19.15993017]], [9.99, [969.3356593, 19.15993017]], [10.00,$
$[969.3356593, 19.15993017]], [10.01, [969.3356593, 19.15993017]]]$

beta is, $\dfrac{21}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [964.8171858, 21.21548438]], [9.99, [964.8171858, 21.21548438]], [10.00,$
$[964.8171858, 21.21548438]], [10.01, [964.8171858, 21.21548438]]]$

beta is, $\dfrac{23}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [960.0707508, 23.27787743]], [9.99, [960.0707508, 23.27787743]], [10.00,$
$[960.0707508, 23.27787743]], [10.01, [960.0707508, 23.27787743]]]$

beta is, $\dfrac{5}{2}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [955.1020392, 25.34693877]], [9.99, [955.1020392, 25.34693877]], [10.00,$
$[955.1020392, 25.34693877]], [10.01, [955.1020392, 25.34693877]]]$

beta is, $\dfrac{27}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [949.9170149, 27.42248950]], [9.99, [949.9170149, 27.42248950]], [10.00,$
$[949.9170149, 27.42248950]], [10.01, [949.9170149, 27.42248950]]]$

beta is, $\dfrac{29}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [944.5219011, 29.50434292]], [9.99, [944.5219011, 29.50434292]], [10.00,$
$[944.5219011, 29.50434292]], [10.01, [944.5219011, 29.50434292]]]$

beta is, $\dfrac{31}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [938.9231598, 31.59230516]], [9.99, [938.9231598, 31.59230516]], [10.00,$
$[938.9231598, 31.59230516]], [10.01, [938.9231598, 31.59230516]]]$

beta is, $\dfrac{33}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [933.1274712, 33.68617582]], [9.99, [933.1274712, 33.68617582]], [10.00,$
$[933.1274712, 33.68617582]], [10.01, [933.1274712, 33.68617582]]]$

beta is, $\dfrac{7}{2}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [927.1417118, 35.78574860]], [9.99, [927.1417118, 35.78574860]], [10.00,$
$[927.1417118, 35.78574860]], [10.01, [927.1417118, 35.78574860]]]$

beta is, $\dfrac{37}{10}$ *, times the threshold value*

$[[9.98, [920.9729335, 37.89081195]], [9.99, [920.9729335, 37.89081195]], [10.00,$
$[920.9729335, 37.89081195]], [10.01, [920.9729335, 37.89081195]]]$

beta is, $\dfrac{39}{10}$*, times the threshold value*

the long-term behavior is

$[[9.98, [914.6283415, 40.00114971]], [9.99, [914.6283415, 40.00114971]], [10.00,$ **(1)**
$[914.6283415, 40.00114971]], [10.01, [914.6283415, 40.00114971]]]$

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> *# For beta = 0.3* $\dfrac{N}{nu}$*, at t = 10, the number removed is 0.32*

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> *# For beta = 0.9* $\dfrac{N}{nu}$*, at t = 10, the number removed is 2.68*

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> *# For beta = 3.9* $\dfrac{N}{nu}$*, at t = 10, the number removed is 45.37*

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> *#(ii)*
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> *SIRSdemo*$(1000, 200, 3, 2, 0.01, 10)$

This is a numerical demonstration of the R0 phenomenon in the SIRS model using discretization
with mesh size=, 0.01, and letting it run until time t=, 10
with population size, 1000, and fixed parameters nu=, 2, and gamma=, 3
where we change beta from 0.2*nu/N to 4*nu/N

Recall that the epidemic will persist if beta exceeds nu/N, that in this case is, $\dfrac{1}{500}$

We start with , 200, infected individuals, 0 removed and hence, 800, susceptible
We will show what happens once time is close to, 10

beta is, $\dfrac{1}{10}$*, times the threshold value*

the long-term behavior is

$[[9.98, [998.9334028, 0.9819978668]], [9.99, [998.9334028, 0.9819978668]], [10.00, [998.9334028, 0.9819978668]], [10.01, [998.9334028, 0.9819978668]]]$

beta is, $\dfrac{3}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [996.4021571, 2.957935239]], [9.99, [996.4021571, 2.957935239]], [10.00, [996.4021571, 2.957935239]], [10.01, [996.4021571, 2.957935239]]]$

beta is, $\dfrac{1}{2}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [993.3444243, 4.949667221]], [9.99, [993.3444243, 4.949667221]], [10.00, [993.3444243, 4.949667221]], [10.01, [993.3444243, 4.949667221]]]$

beta is, $\dfrac{7}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [989.7667603, 6.956997143]], [9.99, [989.7667603, 6.956997143]], [10.00, [989.7667603, 6.956997143]], [10.01, [989.7667603, 6.956997143]]]$

beta is, $\dfrac{9}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [985.6773407, 8.979679729]], [9.99, [985.6773407, 8.979679729]], [10.00, [985.6773407, 8.979679729]], [10.01, [985.6773407, 8.979679729]]]$

beta is, $\dfrac{11}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [981.0859054, 11.01742279]], [9.99, [981.0859054, 11.01742279]], [10.00, [981.0859054, 11.01742279]], [10.01, [981.0859054, 11.01742279]]]$

beta is, $\dfrac{13}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [976.0036901, 13.06988925]], [9.99, [976.0036901, 13.06988925]], [10.00, [976.0036901, 13.06988925]], [10.01, [976.0036901, 13.06988925]]]$

beta is, $\dfrac{3}{2}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [970.4433482, 15.13669951]], [9.99, [970.4433482, 15.13669951]], [10.00, [970.4433482, 15.13669951]], [10.01, [970.4433482, 15.13669951]]]$

beta is, $\dfrac{17}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [964.4188616, 17.21743410]], [9.99, [964.4188616, 17.21743410]], [10.00, [964.4188616, 17.21743410]], [10.01, [964.4188616, 17.21743410]]]

beta is, $\dfrac{19}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [957.9454447, 19.31163661]], [9.99, [957.9454447, 19.31163661]], [10.00, [957.9454447, 19.31163661]], [10.01, [957.9454447, 19.31163661]]]

beta is, $\dfrac{21}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [951.0394389, 21.41881679]], [9.99, [951.0394389, 21.41881679]], [10.00, [951.0394389, 21.41881679]], [10.01, [951.0394389, 21.41881679]]]

beta is, $\dfrac{23}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [943.7182031, 23.53845386]], [9.99, [943.7182031, 23.53845386]], [10.00, [943.7182031, 23.53845386]], [10.01, [943.7182031, 23.53845386]]]

beta is, $\dfrac{5}{2}$ *, times the threshold value*

the long-term behavior is

[[9.98, [935.9999984, 25.67000000]], [9.99, [935.9999984, 25.67000000]], [10.00, [935.9999984, 25.67000000]], [10.01, [935.9999984, 25.67000000]]]

beta is, $\dfrac{27}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [927.9038703, 27.81288384]], [9.99, [927.9038703, 27.81288384]], [10.00, [927.9038703, 27.81288384]], [10.01, [927.9038703, 27.81288384]]]

beta is, $\dfrac{29}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [919.4495282, 29.96651411]], [9.99, [919.4495282, 29.96651411]], [10.00, [919.4495282, 29.96651411]], [10.01, [919.4495282, 29.96651411]]]

beta is, $\dfrac{31}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [910.6572255, 32.13028319]], [9.99, [910.6572255, 32.13028319]], [10.00,

$[910.6572255, 32.13028319]], [10.01, [910.6572255, 32.13028319]]]$

beta is, $\dfrac{33}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [901.5476397, 34.30357076]], [9.99, [901.5476397, 34.30357076]], [10.00,$
$[901.5476397, 34.30357076]], [10.01, [901.5476397, 34.30357076]]]$

beta is, $\dfrac{7}{2}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [892.1417551, 36.48574730]], [9.99, [892.1417551, 36.48574730]], [10.00,$
$[892.1417551, 36.48574730]], [10.01, [892.1417551, 36.48574730]]]$

beta is, $\dfrac{37}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [882.4607475, 38.67617753]], [9.99, [882.4607475, 38.67617753]], [10.00,$
$[882.4607475, 38.67617753]], [10.01, [882.4607475, 38.67617753]]]$

beta is, $\dfrac{39}{10}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [872.5258747, 40.87422371]], [9.99, [872.5258747, 40.87422371]], [10.00,$ **(2)**
$[872.5258747, 40.87422371]], [10.01, [872.5258747, 40.87422371]]]$

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>

> *# For beta = 0.3* $\dfrac{N}{nu}$ *, at t = 10, the number removed is* 0.64

>

> *# For beta = 0.9* $\dfrac{N}{nu}$ *, at t = 10, the number removed is* 5.34

>

> *# For beta = 3.9* $\dfrac{N}{nu}$ *, at t = 10, the number removed is* 86.59

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> *#(iii)*

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> *SIRSdemo*(1000, 200, 7, 3, 0.01, 10)

This is a numerical demonstration of the R0 phenomenon in the SIRS model using discretization

with mesh size=, 0.01, and letting it run until time t=, 10

with population size, 1000, and fixed parameters nu=, 3, and gamma=, 7

where we change beta from 0.2*nu/N to 4*nu/N

Recall that the epidemic will persist if beta exceeds nu/N, that in this case is, $\dfrac{3}{1000}$

We start with , 200, infected individuals, 0 removed and hence, 800, susceptible

We will show what happens once time is close to, 10

beta is, $\dfrac{1}{10}$*, times the threshold value*

the long-term behavior is

[[9.98, [998.9571869, 0.9729968716]], [9.99, [998.9571869, 0.9729968716]], [10.00, [998.9571869, 0.9729968716]], [10.01, [998.9571869, 0.9729968716]]]

beta is, $\dfrac{3}{10}$*, times the threshold value*

the long-term behavior is

[[9.98, [996.6155905, 2.936908621]], [9.99, [996.6155905, 2.936908621]], [10.00, [996.6155905, 2.936908621]], [10.01, [996.6155905, 2.936908621]]]

beta is, $\dfrac{1}{2}$*, times the threshold value*

the long-term behavior is

[[9.98, [993.9350689, 4.924545130]], [9.99, [993.9350689, 4.924545130]], [10.00, [993.9350689, 4.924545130]], [10.01, [993.9350689, 4.924545130]]]

beta is, $\dfrac{7}{10}$*, times the threshold value*

the long-term behavior is

[[9.98, [990.9190693, 6.935665103]], [9.99, [990.9190693, 6.935665103]], [10.00, [990.9190693, 6.935665103]], [10.01, [990.9190693, 6.935665103]]]

beta is, $\dfrac{9}{10}$*, times the threshold value*

the long-term behavior is

[[9.98, [987.5717147, 8.969979927]], [9.99, [987.5717147, 8.969979927]], [10.00,

[987.5717147, 8.969979927]], [10.01, [987.5717147, 8.969979927]]]

beta is, $\frac{11}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [983.8977865, 11.02715490]], [9.99, [983.8977865, 11.02715490]], [10.00, [983.8977865, 11.02715490]], [10.01, [983.8977865, 11.02715490]]]

beta is, $\frac{13}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [979.9027040, 13.10681067]], [9.99, [979.9027040, 13.10681067]], [10.00, [979.9027040, 13.10681067]], [10.01, [979.9027040, 13.10681067]]]

beta is, $\frac{3}{2}$ *, times the threshold value*

the long-term behavior is

[[9.98, [975.5925002, 15.20852494]], [9.99, [975.5925002, 15.20852494]], [10.00, [975.5925002, 15.20852494]], [10.01, [975.5925002, 15.20852494]]]

beta is, $\frac{17}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [970.9737953, 17.33183428]], [9.99, [970.9737953, 17.33183428]], [10.00, [970.9737953, 17.33183428]], [10.01, [970.9737953, 17.33183428]]]

beta is, $\frac{19}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [966.0537675, 19.47623623]], [9.99, [966.0537675, 19.47623623]], [10.00, [966.0537675, 19.47623623]], [10.01, [966.0537675, 19.47623623]]]

beta is, $\frac{21}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [960.8401210, 21.64119148]], [9.99, [960.8401210, 21.64119148]], [10.00, [960.8401210, 21.64119148]], [10.01, [960.8401210, 21.64119148]]]

beta is, $\frac{23}{10}$ *, times the threshold value*

the long-term behavior is

[[9.98, [955.3410529, 23.82612625]], [9.99, [955.3410529, 23.82612625]], [10.00, [955.3410529, 23.82612625]], [10.01, [955.3410529, 23.82612625]]]

beta is, $\frac{5}{2}$ *, times the threshold value*

the long-term behavior is

$[[9.98, [949.5652167, 26.03043478]], [9.99, [949.5652167, 26.03043478]], [10.00,$
$[949.5652167, 26.03043478]], [10.01, [949.5652167, 26.03043478]]]$

beta is, $\dfrac{27}{10}$*, times the threshold value*

the long-term behavior is

$[[9.98, [943.5216861, 28.25348193]], [9.99, [943.5216861, 28.25348193]], [10.00,$
$[943.5216861, 28.25348193]], [10.01, [943.5216861, 28.25348193]]]$

beta is, $\dfrac{29}{10}$*, times the threshold value*

the long-term behavior is

$[[9.98, [937.2199158, 30.49460585]], [9.99, [937.2199158, 30.49460585]], [10.00,$
$[937.2199158, 30.49460585]], [10.01, [937.2199158, 30.49460585]]]$

beta is, $\dfrac{31}{10}$*, times the threshold value*

the long-term behavior is

$[[9.98, [930.6697029, 32.75312075]], [9.99, [930.6697029, 32.75312075]], [10.00,$
$[930.6697029, 32.75312075]], [10.01, [930.6697029, 32.75312075]]]$

beta is, $\dfrac{33}{10}$*, times the threshold value*

the long-term behavior is

$[[9.98, [923.8811464, 35.02831970]], [9.99, [923.8811464, 35.02831970]], [10.00,$
$[923.8811464, 35.02831970]], [10.01, [923.8811464, 35.02831970]]]$

beta is, $\dfrac{7}{2}$*, times the threshold value*

the long-term behavior is

$[[9.98, [916.8646074, 37.31947743]], [9.99, [916.8646074, 37.31947743]], [10.00,$
$[916.8646074, 37.31947743]], [10.01, [916.8646074, 37.31947743]]]$

beta is, $\dfrac{37}{10}$*, times the threshold value*

the long-term behavior is

$[[9.98, [909.6306685, 39.62585316]], [9.99, [909.6306685, 39.62585316]], [10.00,$
$[909.6306685, 39.62585316]], [10.01, [909.6306685, 39.62585316]]]$

beta is, $\dfrac{39}{10}$*, times the threshold value*

the long-term behavior is

$[[9.98, [902.1900937, 41.94669340]], [9.99, [902.1900937, 41.94669340]], [10.00,$ **(3)**
$[902.1900937, 41.94669340]], [10.01, [902.1900937, 41.94669340]]]$

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> # *For beta* $= 0.3 \frac{N}{nu}$, *at t* $= 10$, *the number removed is* 0.45

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> # *For beta* $= 0.9 \frac{N}{nu}$, *at t* $= 10$, *the number removed is* 3.46

>

> # *For beta* $= 3.9 \frac{N}{nu}$, *at t* $= 10$, *the number removed is* 55.86

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> #2

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> $F := RandNice([x, y], 8)$

$$F := [(5 - 3\,x - 8\,y)\,(1 - 8\,x - 5\,y),\ (2 - 3\,x - 2\,y)\,(2 - 4\,x - 8\,y)] \tag{4}$$

> #(i)

>

> $sys := \{(5 - 3 \cdot x - 8 \cdot y) \cdot (1 - 8 \cdot x - 5 \cdot y) = 0,\ (2 - 3 \cdot x - 2 \cdot y) \cdot (2 - 4 \cdot x - 8 \cdot y) = 0\}$

$$sys := \{(2 - 3\,x - 2\,y)\,(2 - 4\,x - 8\,y) = 0,\ (5 - 3\,x - 8\,y)\,(1 - 8\,x - 5\,y) = 0\} \tag{5}$$

> $solve(sys, \{x, y\})$

$$\left\{x = \frac{1}{3}, y = \frac{1}{2}\right\},\ \{x = -8, y = 13\},\ \left\{x = -3, y = \frac{7}{4}\right\},\ \left\{x = -\frac{1}{22}, y = \frac{3}{11}\right\} \tag{6}$$

> #These are the equilibrium points.

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> #(ii)

>

> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$

$$J := \begin{bmatrix} -43 + 48\,x + 79\,y & -33 + 79\,x + 80\,y \\ -14 + 24\,x + 32\,y & -20 + 32\,x + 32\,y \end{bmatrix} \tag{7}$$

>

> # @ $\left\{x = \frac{1}{3}, y = \frac{1}{2}\right\}$

> $J := subs\left(x = \dfrac{1}{3}, J\right):$

> $J := subs\left(y = \dfrac{1}{2}, J\right)$

$$J := \begin{bmatrix} \dfrac{25}{2} & \dfrac{100}{3} \\ 10 & \dfrac{20}{3} \end{bmatrix} \tag{8}$$

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} 28.07225644 \\ -8.905589777 \end{bmatrix} \tag{9}$$

> $\#28 > 0$ so $\left\{x = \dfrac{1}{3}, y = \dfrac{1}{2}\right\}$ is unstable.

>

>

>

>

> $\#@ \; \{x = -8, y = 13\}$

>

> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$

$$J := \begin{bmatrix} -43 + 48\,x + 79\,y & -33 + 79\,x + 80\,y \\ -14 + 24\,x + 32\,y & -20 + 32\,x + 32\,y \end{bmatrix} \tag{10}$$

>

> $J := subs(x = -8, J):$

> $J := subs(y = 13, J)$

$$J := \begin{bmatrix} 600 & 375 \\ 210 & 140 \end{bmatrix} \tag{11}$$

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} 732.8360512 \\ 7.1639488 \end{bmatrix} \tag{12}$$

> #This point is not stable.

>

>

>

>

> $\#@ \; \left\{x = -3, y = \dfrac{7}{4}\right\}$

>

>

> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$

$$J := \begin{bmatrix} -43 + 48\,x + 79\,y & -33 + 79\,x + 80\,y \\ -14 + 24\,x + 32\,y & -20 + 32\,x + 32\,y \end{bmatrix} \qquad (13)$$

>

> $J := subs(x = -3, J):$

> $J := subs\left(y = \dfrac{7}{4}, J\right)$

$$J := \begin{bmatrix} -\dfrac{195}{4} & -130 \\ -30 & -60 \end{bmatrix} \qquad (14)$$

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} 8.32779600 \\ -117.0777960 \end{bmatrix} \qquad (15)$$

> #This point is not stable.

>

>

>

>

> #@ $\left\{ x = -\dfrac{1}{22}, y = \dfrac{3}{11} \right\}$

>

>

>

> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$

$$J := \begin{bmatrix} -43 + 48\,x + 79\,y & -33 + 79\,x + 80\,y \\ -14 + 24\,x + 32\,y & -20 + 32\,x + 32\,y \end{bmatrix} \qquad (16)$$

>

>

> $J := subs\left(x = -\dfrac{1}{22}, J\right):$

> $J := subs\left(y = \dfrac{3}{11}, J\right)$

$$J := \begin{bmatrix} -\dfrac{260}{11} & -\dfrac{325}{22} \\ -\dfrac{70}{11} & -\dfrac{140}{11} \end{bmatrix} \qquad (17)$$

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} -7.05705614 \\ -29.30658022 \end{bmatrix} \qquad (18)$$

> *#This point is stable.*

>

>

>

> *#set of stable equilibrium points: $\{\{x = -\dfrac{1}{22}, y = \dfrac{3}{11}\}\}$*

>

>

>

> $\left\{x = \dfrac{1}{3}, y = \dfrac{1}{2}\right\}, \{x = -8, y = 13\}, \left\{x = -3, y = \dfrac{7}{4}\right\}, \left\{x = -\dfrac{1}{22}, y = \dfrac{3}{11}\right\}$

> *#(iii)*

>

>

>

> *#` `$\left\{x = \dfrac{1}{3}, y = \dfrac{1}{2}\right\}$*

>

> $Dis2\left(F, x, y, \left[\dfrac{1}{3} + 0.1, \dfrac{1}{2} + 0.1\right], 0.01, 2\right);$

$[\,[0.01, [0.4333333333, 0.6000000000]], [0.02, [0.4934666666, 0.6226666667]], [0.03,$ **(19)**
    $[0.5820632985, 0.6586282048]], [0.04, [0.7221136727, 0.7181522598]], [0.05,$
    $[0.9657433495, 0.8244665204]], [0.06, [1.453152444, 1.039838959]], [0.07,$
    $[2.668177721, 1.578364726]], [0.08, [7.082068891, 3.529679646]], [0.09,$
    $[39.69078148, 17.88349920]], [0.10, [1083.535906, 476.1434118]], [0.11,$
    $[780493.1737, 342483.1892]], [0.12, [4.042905036 \times 10^{11}, 1.774055268 \times 10^{11}]], [0.13,$
    $[1.084787452 \times 10^{23}, 4.760121104 \times 10^{22}]], [0.14, [7.809921795 \times 10^{45}, 3.427046912$
    $\times 10^{45}]], [0.15, [4.048095605 \times 10^{91}, 1.776331937 \times 10^{91}]], [0.16, [1.087574238$
    $\times 10^{183}, 4.772349871 \times 10^{182}]], [0.17, [7.850100440 \times 10^{365}, 3.444677568 \times 10^{365}]],$
    $[0.18, [4.089854114 \times 10^{731}, 1.794655856 \times 10^{731}]], [0.19, [1.110127916 \times 10^{1463},$
    $4.871316947 \times 10^{1462}]], [0.20, [8.179060822 \times 10^{2925}, 3.589027626 \times 10^{2925}]], [0.21,$
    $[4.439808779 \times 10^{5851}, 1.948218348 \times 10^{5851}]], [0.22, [1.308235474 \times 10^{11703},$
    $5.740626415 \times 10^{11702}]], [0.23, [1.135871578 \times 10^{23406}, 4.984281891 \times 10^{23405}]], [0.24,$
    $[8.562801087 \times 10^{46811}, 3.757415469 \times 10^{46811}]], [0.25, [4.866190439 \times 10^{93623},$
    $2.135317526 \times 10^{93623}]], [0.26, [1.571576740 \times 10^{187247}, 6.896185831 \times 10^{187246}]],$
    $[0.27, [1.639187278 \times 10^{374494}, 7.192865480 \times 10^{374493}]], [0.28, [1.783259472$

$\times 10^{748988}, 7.825064090 \times 10^{748987}]], [0.29, [2.110505408 \times 10^{1497976}, 9.261041552$
$\times 10^{1497975}]], [0.30, [2.956176286 \times 10^{2995952}, 1.297190299 \times 10^{2995952}]], [0.31,$
$[5.799867173 \times 10^{5991904}, 2.545021240 \times 10^{5991904}]], [0.32, [2.232510372 \times 10^{11983809},$
$9.796407651 \times 10^{11983808}]], [0.33, [3.307838982 \times 10^{23967618}, 1.451502286$
$\times 10^{23967618}]], [0.34, [7.261830570 \times 10^{47935236}, 3.186540741 \times 10^{47935236}]], [0.35,$
$[3.499851471 \times 10^{95870473}, 1.535758676 \times 10^{95870473}]], [0.36, [8.129364897$
$\times 10^{191740946}, 3.567220714 \times 10^{191740946}]], [0.37, [4.386020181 \times 10^{383481893},$
$1.924615545 \times 10^{383481893}]], [0.38, [1.276728760 \times 10^{766963787}, 5.602372800$
$\times 10^{766963786}]], [0.39, [1.081819170 \times 10^{1533927574}, 4.747096241 \times 10^{1533927573}]], [0.40,$
$[7.767240204 \times 10^{3067855147}, 3.408317932 \times 10^{3067855147}]], [0.41, [4.003970436$
$\times 10^{6135710295}, 1.756969513 \times 10^{6135710295}]], [0.42, [1.063993842 \times 10^{12271420591},$
$4.668877486 \times 10^{12271420590}]], [0.43, [7.513384576 \times 10^{24542841181}, 3.296924353$
$\times 10^{24542841181}]], [0.44, [3.746524940 \times 10^{49085682363}, 1.644000675 \times 10^{49085682363}]],$
$[0.45, [9.315681808 \times 10^{98171364726}, 4.087784660 \times 10^{98171364726}]], [0.46, [5.759525192$
$\times 10^{196342729453}, 2.527318903 \times 10^{196342729453}]], [0.47, [2.201561159 \times 10^{392685458907},$
$9.660600394 \times 10^{392685458906}]], [0.48, [3.216761774 \times 10^{785370917814}, 1.411536988$
$\times 10^{785370917814}]], [0.49, [6.867444978 \times 10^{1570741835628}, 3.013481657$
$\times 10^{1570741835628}]], [0.50, [3.130024718 \times 10^{3141483671257}, 1.373476176$
$\times 10^{3141483671257}]], [0.51, [6.502089218 \times 10^{6282967342514}, 2.853161060$
$\times 10^{6282967342514}]], [0.52, [2.805842175 \times 10^{12565934685029}, 1.231222667$
$\times 10^{12565934685029}]], [0.53, [5.224970801 \times 10^{25131869370058}, 2.292752794$
$\times 10^{25131869370058}]], [0.54, [1.811862037 \times 10^{50263738740117}, 7.950574092$
$\times 10^{50263738740116}]], [0.55, [2.178751210 \times 10^{100527477480234}, 9.560508780$
$\times 10^{100527477480233}]], [0.56, [3.150450588 \times 10^{201054954960468}, 1.382439187$
$\times 10^{201054954960468}]], [0.57, [6.587228596 \times 10^{402109909920936}, 2.890520798$
$\times 10^{402109909920936}]], [0.58, [2.879803532 \times 10^{804219819841873}, 1.263677415$
$\times 10^{804219819841873}]], [0.59, [5.504059378 \times 10^{1608439639683746}, 2.415218763$
$\times 10^{1608439639683746}]], [0.60, [2.010590429 \times 10^{3216879279367493}, 8.822607817$
$\times 10^{3216879279367492}]], [0.61, [2.682900780 \times 10^{6433758558734986}, 1.177275145$
$\times 10^{6433758558734986}]], [0.62, [4.777125089 \times 10^{12867517117469972}, 2.096235044$
$\times 10^{12867517117469972}]], [0.63, [1.514574418 \times 10^{25735034234939945}, 6.646055760$
$\times 10^{25735034234939944}]], [0.64, [1.522434525 \times 10^{51470068469879890}, 6.680546447$

$\times 10^{51470068469879889}]]$, $[0.65, [1.538277325 \times 10^{102940136939759780}, 6.750065732$
$\times 10^{102940136939759779}]]$, $[0.66, [1.570459232 \times 10^{205880273879519560}, 6.891282133$
$\times 10^{205880273879519559}]]$, $[0.67, [1.636856940 \times 10^{411760547759039120}, 7.182639795$
$\times 10^{411760547759039119}]]$, $[0.68, [1.778192763 \times 10^{823521095518078240}, 7.802831018$
$\times 10^{823521095518078239}]]$, $[0.69, [2.098529441 \times 10^{1647042191036156480}, 9.208490203$
$\times 10^{1647042191036156479}]]$, $[0.70, [2.922722098 \times 10^{3294084382072312960}, 1.282510375$
$\times 10^{3294084382072312960}]]$, $[0.71, [5.669339132 \times 10^{6588168764144625920}, 2.487744645$
$\times 10^{6588168764144625920}]]$, $[0.72, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.73, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[0.74, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.75, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.76, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[0.77, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.78, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.79, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.80, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.81, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[0.82, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.83, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.84, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[0.85, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.86, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.87, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.88, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.89, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[0.90, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.91, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.92, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[0.93, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.94, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.95, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.96, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.97, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[0.98, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.99, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.00, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.01, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.02, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.03, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.04, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.05, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.06, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.07, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.08, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.09, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.10, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.11, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.12, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.13, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.14, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.15, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.16, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.17, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.18, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.19, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.20, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.21, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.22, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.23, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.24, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.25, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.26, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.27, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.28, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.29, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.30, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.31, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.32, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.33, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.34, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.35, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.36, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.37, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.38, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.39, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.40, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.41, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.42, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.43, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.44, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.45, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.46, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.47, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.48, [\text{Float}(\infty),$

$\text{Float}(\infty)]], [1.49, [\text{Float}(\infty), \text{Float}(\infty)]], [1.50, [\text{Float}(\infty), \text{Float}(\infty)]], [1.51, [\text{Float}(\infty), \text{Float}(\infty)]], [1.52, [\text{Float}(\infty), \text{Float}(\infty)]], [1.53, [\text{Float}(\infty), \text{Float}(\infty)]], [1.54, [\text{Float}(\infty), \text{Float}(\infty)]], [1.55, [\text{Float}(\infty), \text{Float}(\infty)]], [1.56, [\text{Float}(\infty), \text{Float}(\infty)]], [1.57, [\text{Float}(\infty), \text{Float}(\infty)]], [1.58, [\text{Float}(\infty), \text{Float}(\infty)]], [1.59, [\text{Float}(\infty), \text{Float}(\infty)]], [1.60, [\text{Float}(\infty), \text{Float}(\infty)]], [1.61, [\text{Float}(\infty), \text{Float}(\infty)]], [1.62, [\text{Float}(\infty), \text{Float}(\infty)]], [1.63, [\text{Float}(\infty), \text{Float}(\infty)]], [1.64, [\text{Float}(\infty), \text{Float}(\infty)]], [1.65, [\text{Float}(\infty), \text{Float}(\infty)]], [1.66, [\text{Float}(\infty), \text{Float}(\infty)]], [1.67, [\text{Float}(\infty), \text{Float}(\infty)]], [1.68, [\text{Float}(\infty), \text{Float}(\infty)]], [1.69, [\text{Float}(\infty), \text{Float}(\infty)]], [1.70, [\text{Float}(\infty), \text{Float}(\infty)]], [1.71, [\text{Float}(\infty), \text{Float}(\infty)]], [1.72, [\text{Float}(\infty), \text{Float}(\infty)]], [1.73, [\text{Float}(\infty), \text{Float}(\infty)]], [1.74, [\text{Float}(\infty), \text{Float}(\infty)]], [1.75, [\text{Float}(\infty), \text{Float}(\infty)]], [1.76, [\text{Float}(\infty), \text{Float}(\infty)]], [1.77, [\text{Float}(\infty), \text{Float}(\infty)]], [1.78, [\text{Float}(\infty), \text{Float}(\infty)]], [1.79, [\text{Float}(\infty), \text{Float}(\infty)]], [1.80, [\text{Float}(\infty), \text{Float}(\infty)]], [1.81, [\text{Float}(\infty), \text{Float}(\infty)]], [1.82, [\text{Float}(\infty), \text{Float}(\infty)]], [1.83, [\text{Float}(\infty), \text{Float}(\infty)]], [1.84, [\text{Float}(\infty), \text{Float}(\infty)]], [1.85, [\text{Float}(\infty), \text{Float}(\infty)]], [1.86, [\text{Float}(\infty), \text{Float}(\infty)]], [1.87, [\text{Float}(\infty), \text{Float}(\infty)]], [1.88, [\text{Float}(\infty), \text{Float}(\infty)]], [1.89, [\text{Float}(\infty), \text{Float}(\infty)]], [1.90, [\text{Float}(\infty), \text{Float}(\infty)]], [1.91, [\text{Float}(\infty), \text{Float}(\infty)]], [1.92, [\text{Float}(\infty), \text{Float}(\infty)]], [1.93, [\text{Float}(\infty), \text{Float}(\infty)]], [1.94, [\text{Float}(\infty), \text{Float}(\infty)]], [1.95, [\text{Float}(\infty), \text{Float}(\infty)]], [1.96, [\text{Float}(\infty), \text{Float}(\infty)]], [1.97, [\text{Float}(\infty), \text{Float}(\infty)]], [1.98, [\text{Float}(\infty), \text{Float}(\infty)]], [1.99, [\text{Float}(\infty), \text{Float}(\infty)]], [2.00, [\text{Float}(\infty), \text{Float}(\infty)]], [2.01, [\text{Float}(\infty), \text{Float}(\infty)]]]$

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>
> $\#\{x = -8, y = 13\}$
>

> $Dis2(F, x, y, [-8 + 0.1, 13 + 0.1], 0.01, 2);$

$$[[0.01, [-7.9, 13.1]], [0.02, [-6.9107, 13.4560]], [0.03, [2.095461710, 16.71653936]], \quad \textbf{(20)}$$
$$[0.04, [136.2316666, 69.56684993]], [0.05, [13931.73396, 6070.743074]], [0.06,$$
$$[1.281448992 \times 10^8, 5.625503173 \times 10^7]], [0.07, [1.090186749 \times 10^{16}, 4.783688944$$
$$\times 10^{15}]], [0.08, [7.887704643 \times 10^{31}, 3.461184031 \times 10^{31}]], [0.09, [4.129136016$$
$$\times 10^{63}, 1.811892848 \times 10^{63}]], [0.10, [1.131555179 \times 10^{127}, 4.965341265 \times 10^{126}]],$$
$$[0.11, [8.497846170 \times 10^{253}, 3.728912809 \times 10^{253}]], [0.12, [4.792643445 \times 10^{507},$$
$$2.103044604 \times 10^{507}]], [0.13, [1.524430505 \times 10^{1015}, 6.689304942 \times 10^{1014}]], [0.14,$$

$\big[1.542313470 \times 10^{2030}, 6.767776608 \times 10^{2029}\big]\big], \big[0.15, \big[1.578711211 \times 10^{4060},$
$6.927492382 \times 10^{4059}\big]\big], \big[0.16, \big[1.654103865 \times 10^{8120}, 7.258320480 \times 10^{8119}\big]\big], \big[0.17,$
$\big[1.815862429 \times 10^{16240}, 7.968128079 \times 10^{16239}\big]\big], \big[0.18, \big[2.188382715 \times 10^{32480},$
$9.602772486 \times 10^{32479}\big]\big], \big[0.19, \big[3.178366259 \times 10^{64960}, 1.394688774 \times 10^{64960}\big]\big], \big[0.20,$
$\big[6.704482684 \times 10^{129920}, 2.941972690 \times 10^{129920}\big]\big], \big[0.21, \big[2.983238237 \times 10^{259841},$
$1.309065268 \times 10^{259841}\big]\big], \big[0.22, \big[5.906541555 \times 10^{519682}, 2.591830686 \times 10^{519682}\big]\big],$
$\big[0.23, \big[2.315388744 \times 10^{1039365}, 1.016008359 \times 10^{1039365}\big]\big], \big[0.24, \big[3.557994112$
$\times 10^{2078730}, 1.561272064 \times 10^{2078730}\big]\big], \big[0.25, \big[8.401712970 \times 10^{4157460}, 3.686728906$
$\times 10^{4157460}\big]\big], \big[0.26, \big[4.684821748 \times 10^{8314921}, 2.055731708 \times 10^{8314921}\big]\big], \big[0.27,$
$\big[1.456610822 \times 10^{16629843}, 6.391707549 \times 10^{16629842}\big]\big], \big[0.28, \big[1.408135523 \times 10^{33259686},$
$6.178994636 \times 10^{33259685}\big]\big], \big[0.29, \big[1.315970941 \times 10^{66519372}, 5.774570166$
$\times 10^{66519371}\big]\big], \big[0.30, \big[1.149343883 \times 10^{133038744}, 5.043399282 \times 10^{133038743}\big]\big], \big[0.31,$
$\big[8.767128407 \times 10^{266077487}, 3.847075691 \times 10^{266077487}\big]\big], \big[0.32, \big[5.101197347$
$\times 10^{532154975}, 2.238440158 \times 10^{532154975}\big]\big], \big[0.33, \big[1.727036993 \times 10^{1064309951},$
$7.578356019 \times 10^{1064309950}\big]\big], \big[0.34, \big[1.979523539 \times 10^{2128619902}, 8.686284193$
$\times 10^{2128619901}\big]\big], \big[0.35, \big[2.600630976 \times 10^{4257239804}, 1.141174595 \times 10^{4257239804}\big]\big],$
$\big[0.36, \big[4.488640797 \times 10^{8514479608}, 1.969646170 \times 10^{8514479608}\big]\big], \big[0.37, \big[1.337171449$
$\times 10^{17028959217}, 5.867599440 \times 10^{17028959216}\big]\big], \big[0.38, \big[1.186674418 \times 10^{34057918434},$
$5.207208215 \times 10^{34057918433}\big]\big], \big[0.39, \big[9.345887528 \times 10^{68115836867}, 4.101039136$
$\times 10^{68115836867}\big]\big], \big[0.40, \big[5.796935798 \times 10^{136231673735}, 2.543734932 \times 10^{136231673735}\big]\big],$
$\big[0.41, \big[2.230254226 \times 10^{272463347471}, 9.786507527 \times 10^{272463347470}\big]\big], \big[0.42,$
$\big[3.301156639 \times 10^{544926694942}, 1.448570030 \times 10^{544926694942}\big]\big], \big[0.43, \big[7.232520182$
$\times 10^{1089853389884}, 3.173679144 \times 10^{1089853389884}\big]\big], \big[0.44, \big[3.471656107 \times 10^{2179706779769},$
$1.523386358 \times 10^{2179706779769}\big]\big], \big[0.45, \big[7.998909574 \times 10^{4359413559538}, 3.509976032$
$\times 10^{4359413559538}\big]\big], \big[0.46, \big[4.246381065 \times 10^{8718827119077}, 1.863340949$
$\times 10^{8718827119077}\big]\big], \big[0.47, \big[1.196727633 \times 10^{17437654238155}, 5.251322410$
$\times 10^{17437654238154}\big]\big], \big[0.48, \big[9.504910433 \times 10^{34875308476309}, 4.170819470$
$\times 10^{34875308476309}\big]\big], \big[0.49, \big[5.995887112 \times 10^{69750616952619}, 2.631036125$
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$\times 10^{279002467810478}\big]\big], \big[0.52, \big[9.473911233 \times 10^{558004935620956}, 4.157216811$
$\times 10^{558004935620956}\big]\big], \big[0.53, \big[5.956841063 \times 10^{1116009871241913}, 2.613902452$

$\times 10^{1116009871241913}]], [0.54, [2.354991887 \times 10^{2232019742483827}, 1.033386489$

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$\times 10^{8928078969935308}]], [0.57, [5.365584687 \times 10^{17856157939870617}, 2.354455125$

$\times 10^{17856157939870617}]], [0.58, [1.910695575 \times 10^{35712315879741235}, 8.384262390$

$\times 10^{35712315879741234}]], [0.59, [2.422927315 \times 10^{71424631759482470}, 1.063197016$

$\times 10^{71424631759482470}]], [0.60, [3.896172365 \times 10^{142849263518964940}, 1.709666985$

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[1.25, [Float(∞), Float(∞)]], [1.26, [Float(∞), Float(∞)]], [1.27, [Float(∞), Float(∞)]], [1.28, [Float(∞), Float(∞)]], [1.29, [Float(∞), Float(∞)]], [1.30, [Float(∞), Float(∞)]], [1.31, [Float(∞), Float(∞)]], [1.32, [Float(∞), Float(∞)]], [1.33, [Float(∞), Float(∞)]], [1.34, [Float(∞), Float(∞)]], [1.35, [Float(∞), Float(∞)]], [1.36, [Float(∞), Float(∞)]], [1.37, [Float(∞), Float(∞)]], [1.38, [Float(∞), Float(∞)]], [1.39, [Float(∞), Float(∞)]], [1.40, [Float(∞), Float(∞)]], [1.41, [Float(∞), Float(∞)]], [1.42, [Float(∞), Float(∞)]], [1.43, [Float(∞), Float(∞)]], [1.44, [Float(∞), Float(∞)]], [1.45, [Float(∞), Float(∞)]], [1.46, [Float(∞), Float(∞)]], [1.47, [Float(∞), Float(∞)]], [1.48, [Float(∞), Float(∞)]], [1.49, [Float(∞), Float(∞)]], [1.50, [Float(∞), Float(∞)]], [1.51, [Float(∞), Float(∞)]], [1.52, [Float(∞), Float(∞)]], [1.53, [Float(∞), Float(∞)]], [1.54, [Float(∞), Float(∞)]], [1.55, [Float(∞), Float(∞)]], [1.56, [Float(∞), Float(∞)]], [1.57, [Float(∞), Float(∞)]], [1.58, [Float(∞), Float(∞)]], [1.59, [Float(∞), Float(∞)]], [1.60, [Float(∞), Float(∞)]], [1.61, [Float(∞), Float(∞)]], [1.62, [Float(∞), Float(∞)]], [1.63, [Float(∞), Float(∞)]], [1.64, [Float(∞), Float(∞)]], [1.65, [Float(∞), Float(∞)]], [1.66, [Float(∞), Float(∞)]], [1.67, [Float(∞), Float(∞)]], [1.68, [Float(∞), Float(∞)]], [1.69, [Float(∞), Float(∞)]], [1.70, [Float(∞), Float(∞)]], [1.71, [Float(∞), Float(∞)]], [1.72, [Float(∞), Float(∞)]], [1.73, [Float(∞), Float(∞)]], [1.74, [Float(∞), Float(∞)]], [1.75, [Float(∞), Float(∞)]], [1.76, [Float(∞), Float(∞)]], [1.77, [Float(∞), Float(∞)]], [1.78, [Float(∞), Float(∞)]], [1.79, [Float(∞), Float(∞)]], [1.80, [Float(∞), Float(∞)]], [1.81, [Float(∞), Float(∞)]], [1.82, [Float(∞), Float(∞)]], [1.83, [Float(∞), Float(∞)]], [1.84, [Float(∞), Float(∞)]], [1.85, [Float(∞), Float(∞)]], [1.86, [Float(∞), Float(∞)]], [1.87, [Float(∞), Float(∞)]], [1.88, [Float(∞), Float(∞)]], [1.89, [Float(∞), Float(∞)]], [1.90, [Float(∞), Float(∞)]], [1.91, [Float(∞), Float(∞)]], [1.92, [Float(∞), Float(∞)]], [1.93, [Float(∞), Float(∞)]], [1.94, [Float(∞), Float(∞)]], [1.95, [Float(∞), Float(∞)]], [1.96, [Float(∞), Float(∞)]], [1.97, [Float(∞), Float(∞)]], [1.98, [Float(∞), Float(∞)]], [1.99, [Float(∞), Float(∞)]], [2.00, [Float(∞), Float(∞)]], [2.01, [Float(∞), Float(∞)]]]

$\#\left\{x = -3, y = \dfrac{7}{4}\right\}$

> $Dis2\left(F, x, y, \left[-3 + 0.1, \dfrac{7}{4} + 0.1\right], 0.01, 2\right);$

$[[0.01, [-2.9, 1.850000000]], [0.02, [-3.064450000, 1.766000000]], [0.03,$ **(21)**
    $[-3.053545960, 1.775944432]], [0.04, [-3.061310184, 1.776448769]], [0.05,$
    $[-3.065903956, 1.779016657]], [0.06, [-3.071628973, 1.781421823]], [0.07,$
    $[-3.077709978, 1.784110851]], [0.08, [-3.084349824, 1.787019921]], [0.09,$
    $[-3.091566291, 1.790186739]], [0.10, [-3.099419246, 1.793631585]], [0.11,$
    $[-3.107966610, 1.797381002]], [0.12, [-3.117273875, 1.801463410]], [0.13,$
    $[-3.127413041, 1.805910363]], [0.14, [-3.138463818, 1.810756715]], [0.15,$
    $[-3.150514510, 1.816041085]], [0.16, [-3.163663130, 1.821806324]], [0.17,$
    $[-3.178018685, 1.828100072]], [0.18, [-3.193702649, 1.834975405]], [0.19,$
    $[-3.210850703, 1.842491587]], [0.20, [-3.229614761, 1.850714945]], [0.21,$
    $[-3.250165343, 1.859719914]], [0.22, [-3.272694409, 1.869590248]], [0.23,$
    $[-3.297418695, 1.880420474]], [0.24, [-3.324583702, 1.892317628]], [0.25,$
    $[-3.354468486, 1.905403327]], [0.26, [-3.387391459, 1.919816270]], [0.27,$
    $[-3.423717377, 1.935715294]], [0.28, [-3.463865960, 1.953283073]], [0.29,$
    $[-3.508322422, 1.972730703]], [0.30, [-3.557650581, 1.994303362]], [0.31,$
    $[-3.612509211, 2.018287388]], [0.32, [-3.673672630, 2.045019203]], [0.33,$
    $[-3.742056925, 2.074896625]], [0.34, [-3.818753538, 2.108393423]], [0.35,$
    $[-3.905072882, 2.146078166]], [0.36, [-4.002601530, 2.188638954]], [0.37,$
    $[-4.113278181, 2.236916254]], [0.38, [-4.239495890, 2.291947106]], [0.39,$
    $[-4.384241757, 2.355025496]], [0.40, [-4.551290877, 2.427786193]], [0.41,$
    $[-4.745480558, 2.512323275]], [0.42, [-4.973105923, 2.611361101]], [0.43,$
    $[-5.242503548, 2.728506585]], [0.44, [-5.564934802, 2.868630943]], [0.45,$
    $[-5.955961700, 3.038464373]], [0.46, [-6.437662139, 3.247553450]], [0.47,$
    $[-7.042335169, 3.509862659]], [0.48, [-7.818982157, 3.846575592]], [0.49,$
    $[-8.845258266, 4.291260923]], [0.50, [-10.25095849, 4.900023832]], [0.51,$
    $[-12.26789811, 5.773067529]], [0.52, [-15.34666230, 7.105158682]], [0.53,$
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    $[-52.04437432, 22.97260745]], [0.56, [-120.5519561, 52.58644309]], [0.57,$
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    $\times 10^{10}]], [0.61, [6.666390702 \times 10^{20}, 3.866156018 \times 10^{20}]], [0.62, [3.700556070$

$\times 10^{41}$, $1.597189587 \times 10^{41}$]], [0.63, [$8.976280289 \times 10^{82}$, $3.942812838 \times 10^{82}$]], [0.64, [$5.351549170 \times 10^{165}$, $2.348153045 \times 10^{165}$]], [0.65, [$1.900625055 \times 10^{331}$, $8.340103131 \times 10^{330}$]], [0.66, [$2.397460734 \times 10^{662}$, $1.052021871 \times 10^{662}$]], [0.67, [$3.814699409 \times 10^{1324}$, $1.673916120 \times 10^{1324}$]], [0.68, [$9.657796249 \times 10^{2648}$, $4.237906806 \times 10^{2648}$]], [0.69, [$6.190325241 \times 10^{5297}$, $2.716356901 \times 10^{5297}$]], [0.70, [$2.543222313 \times 10^{10595}$, $1.115983282 \times 10^{10595}$]], [0.71, [$4.292655542 \times 10^{21190}$, $1.883646505 \times 10^{21190}$]], [0.72, [$1.222952168 \times 10^{42381}$, $5.366397454 \times 10^{42380}$]], [0.73, [$9.926047123 \times 10^{84761}$, $4.355617121 \times 10^{84761}$]], [0.74, [$6.538980700 \times 10^{169523}$, $2.869349291 \times 10^{169523}$]], [0.75, [$2.837772012 \times 10^{339047}$, $1.245233697 \times 10^{339047}$]], [0.76, [$5.344565355 \times 10^{678094}$, $2.345231700 \times 10^{678094}$]], [0.77, [$1.895754844 \times 10^{1356189}$, $8.318701444 \times 10^{1356188}$]], [0.78, [$2.385183184 \times 10^{2712378}$, $1.046634635 \times 10^{2712378}$]], [0.79, [$3.775729451 \times 10^{5424756}$, $1.656815814 \times 10^{5424756}$]], [0.80, [$9.461481076 \times 10^{10849512}$, $4.151762372 \times 10^{10849512}$]], [0.81, [$5.941220080 \times 10^{21699025}$, $2.607047858 \times 10^{21699025}$]], [0.82, [$2.342656808 \times 10^{43398051}$, $1.027973772 \times 10^{43398051}$]], [0.83, [$3.642291757 \times 10^{86796102}$, $1.598262444 \times 10^{86796102}$]], [0.84, [$8.804543673 \times 10^{173592204}$, $3.863493764 \times 10^{173592204}$]], [0.85, [$5.144830772 \times 10^{347184409}$, $2.257586803 \times 10^{347184409}$]], [0.86, [$1.756707998 \times 10^{694368819}$, $7.708554409 \times 10^{694368818}$]], [0.87, [$2.048125416 \times 10^{1388737638}$, $8.987313905 \times 10^{1388737637}$]], [0.88, [$2.784008034 \times 10^{2777475276}$, $1.221641697 \times 10^{2777475276}$]], [0.89, [$5.143969188 \times 10^{5554950552}$, $2.257208735 \times 10^{5554950552}$]], [0.90, [$1.756119669 \times 10^{11109901105}$, $7.705972781 \times 10^{11109901104}$]], [0.91, [$2.046753795 \times 10^{22219802210}$, $8.981295132 \times 10^{22219802209}$]], [0.92, [$2.780280405 \times 10^{44439604420}$, $1.220005988 \times 10^{44439604420}$]], [0.93, [$5.130203442 \times 10^{88879208840}$, $2.251168230 \times 10^{88879208840}$]], [0.94, [$1.746733162 \times 10^{177758417681}$, $7.664784149 \times 10^{177758417680}$]], [0.95, [$2.024932360 \times 10^{355516835362}$, $8.885541195 \times 10^{355516835361}$]], [0.96, [$2.721312598 \times 10^{711033670724}$, $1.194130512 \times 10^{711033670724}$]], [0.97, [$4.914895113 \times 10^{1422067341448}$, $2.156689470 \times 10^{1422067341448}$]], [0.98, [$1.603193334 \times 10^{2844134682897}$, $7.034921603 \times 10^{2844134682896}$]], [0.99, [$1.705804229 \times 10^{5688269365794}$, $7.485185206 \times 10^{5688269365793}$]], [1.00, [$1.931148911 \times 10^{11376538731588}$, $8.474013027 \times 10^{11376538731587}$]], [1.01, [$2.475078157 \times 10^{22753077463176}$, $1.086081162 \times 10^{22753077463176}$]], [1.02, [$4.065699021 \times 10^{45506154926352}$, $1.784056436 \times 10^{45506154926352}$]], [1.03, [$1.097053583 \times 10^{91012309852705}$, 4.813945882

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$\text{Float}(\infty), \text{Float}(\infty)]], [2.00, [\text{Float}(\infty), \text{Float}(\infty)]], [2.01, [\text{Float}(\infty), \text{Float}(\infty)]]]$

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>

> $\#@\left\{ x = -\dfrac{1}{22}, y = \dfrac{3}{11} \right\}$

>
>

> $Dis2\left(F, x, y, \left[-\dfrac{1}{22} + 0.1, \dfrac{3}{11} + 0.1 \right], 0.01, 2 \right);$

$[[0.01, [0.05454545455, 0.3727272727]], [0.02, [0.03043636365, 0.3596363636]], [0.03,$ **(22)**
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$[-0.04545456392, 0.2727272934]]]$

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>

> $F := RandNice([x, y], 8)$
$$F := [(6 - 5x - 6y)(7 - 4x - 7y), (3 - 6x - 5y)(7 - 7x - 3y)] \tag{23}$$

> #(i)

>

> $sys := \{(6 - 5 \cdot x - 6 \cdot y) \cdot (7 - 4 \cdot x - 7 \cdot y) = 0, (3 - 6 \cdot x - 5 \cdot y) \cdot (7 - 7 \cdot x - 3 \cdot y) = 0\}$
$$sys := \{(3 - 6x - 5y)(7 - 7x - 3y) = 0, (6 - 5x - 6y)(7 - 4x - 7y) = 0\} \tag{24}$$

> $solve(sys, \{x, y\})$
$$\left\{x = -\frac{12}{11}, y = \frac{21}{11}\right\}, \left\{x = -\frac{7}{11}, y = \frac{15}{11}\right\}, \left\{x = \frac{8}{9}, y = \frac{7}{27}\right\}, \left\{x = \frac{28}{37}, y = \frac{21}{37}\right\} \tag{25}$$

> #These are the equilibrium points.

>
>

> #(ii)

>

> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$
$$J := \begin{bmatrix} -59 + 40x + 59y & -84 + 59x + 84y \\ -63 + 84x + 53y & -44 + 53x + 30y \end{bmatrix} \tag{26}$$

>
>
>

> #@ $\left\{x = -\frac{12}{11}, y = \frac{21}{11}\right\}$

>

> $J := subs\left(x = -\dfrac{12}{11}, J\right):$

> $J := subs\left(y = \dfrac{21}{11}, J\right)$

$$J := \begin{bmatrix} 10 & 12 \\ -\dfrac{588}{11} & -\dfrac{490}{11} \end{bmatrix} \qquad (27)$$

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} -7.15605255 \\ -27.38940199 \end{bmatrix} \qquad (28)$$

> #This point is stable.
>
>
>
>
> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$

$$J := \begin{bmatrix} -59 + 40\,x + 59\,y & -84 + 59\,x + 84\,y \\ -63 + 84\,x + 53\,y & -44 + 53\,x + 30\,y \end{bmatrix} \qquad (29)$$

>
>
>
> $\#@ \left\{x = -\dfrac{7}{11}, y = \dfrac{15}{11}\right\}$
>
> $J := subs\left(x = -\dfrac{7}{11}, J\right):$

> $J := subs\left(y = \dfrac{15}{11}, J\right)$

$$J := \begin{bmatrix} -4 & -7 \\ -\dfrac{486}{11} & -\dfrac{405}{11} \end{bmatrix} \qquad (30)$$

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} 3.64358028 \\ -44.46176210 \end{bmatrix} \qquad (31)$$

> #This point is not stable.
>
>
>
>

>
>
>
>
>
> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$

$$J := \begin{bmatrix} -59 + 40\,x + 59\,y & -84 + 59\,x + 84\,y \\ -63 + 84\,x + 53\,y & -44 + 53\,x + 30\,y \end{bmatrix} \tag{32}$$

>
>
>

> $\#@ \left\{ x = \dfrac{8}{9},\, y = \dfrac{7}{27} \right\}$

>

> $J := subs\left(x = \dfrac{8}{9}, J \right):$

> $J := subs\left(y = \dfrac{7}{27}, J \right)$

$$J := \begin{bmatrix} -\dfrac{220}{27} & -\dfrac{88}{9} \\ \dfrac{686}{27} & \dfrac{98}{9} \end{bmatrix} \tag{33}$$

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} 1.370370370 + 12.56287343\,I \\ 1.370370370 - 12.56287343\,I \end{bmatrix} \tag{34}$$

> *#This point is not stable.*
>
>
>
>
>
>
>
> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$

$$J := \begin{bmatrix} -59 + 40\,x + 59\,y & -84 + 59\,x + 84\,y \\ -63 + 84\,x + 53\,y & -44 + 53\,x + 30\,y \end{bmatrix} \tag{35}$$

>
>
>

> #@ $\left\{ x = \dfrac{28}{37}, y = \dfrac{21}{37} \right\}$

>

> $J := subs\left(x = \dfrac{28}{37}, J \right):$

> $J := subs\left(y = \dfrac{21}{37}, J \right)$

$$J := \begin{bmatrix} \dfrac{176}{37} & \dfrac{308}{37} \\[2mm] \dfrac{1134}{37} & \dfrac{486}{37} \end{bmatrix}$$

(36)

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} 25.45892865 \\ -7.567036754 \end{bmatrix}$$

(37)

> #This point is not stable.
>
>
>
>
>
>
>
> #(iii)
>
>
>
> #@ $\left\{ x = -\dfrac{12}{11}, y = \dfrac{21}{11} \right\}$
>
>

> $Dis2\left(F, x, y, \left[-\dfrac{12}{11} + 0.1, \dfrac{21}{11} + 0.1 \right], 0.01, 2 \right);$

$[[0.01, [-0.990909091, 2.009090909]], [0.02, [-0.9568090913, 1.922090909]], [0.03,$ (38)
   $[-0.9371430026, 1.853119534]], [0.04, [-0.9275162176, 1.801696233]], [0.05,$
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> $\#@ \left\{ x = -\dfrac{7}{11}, y = \dfrac{15}{11} \right\}$

>

> $Dis2 \left(F, x, y, \left[-\dfrac{7}{11} + 0.1, \dfrac{15}{11} + 0.1 \right], 0.01, 2 \right)$

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$\times 10^{85342170071148396}\big]\big], \big[1.48, \big[8.532117780 \times 10^{170684340142296793}, 7.980648085$
$\times 10^{170684340142296793}\big]\big], \big[1.49, \big[8.148369855 \times 10^{341368680284593587}, 7.621703537$
$\times 10^{341368680284593587}\big]\big], \big[1.50, \big[7.431877049 \times 10^{682737360569187175}, 6.951520931$
$\times 10^{682737360569187175}\big]\big], \big[1.51, \big[6.182357029 \times 10^{1365474721138374351}, 5.782763090$
$\times 10^{1365474721138374351}\big]\big], \big[1.52, \big[4.278240681 \times 10^{2730949442276748703}, 4.001718468$
$\times 10^{2730949442276748703}\big]\big], \big[1.53, \big[2.048742966 \times 10^{5461898884553497407}, 1.916323362$
$\times 10^{5461898884553497407}\big]\big], \big[1.54, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.55, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big],$
$\big[1.56, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.57, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.58, \big[\text{Float}(\infty),$
$\text{Float}(\infty)\big]\big], \big[1.59, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.60, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.61, \big[$
$\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.62, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.63, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big],$
$\big[1.64, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.65, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.66, \big[\text{Float}(\infty),$
$\text{Float}(\infty)\big]\big], \big[1.67, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.68, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.69, \big[$
$\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.70, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.71, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big],$
$\big[1.72, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.73, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.74, \big[\text{Float}(\infty),$
$\text{Float}(\infty)\big]\big], \big[1.75, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.76, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.77, \big[$
$\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.78, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.79, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big],$
$\big[1.80, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.81, \big[\text{Float}(\infty), \text{Float}(\infty)\big]\big], \big[1.82, \big[\text{Float}(\infty),$

$\text{Float}(\infty)]]$, $[1.83, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.84, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.85, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.86, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.87, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.88, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.89, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.90, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.91, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.92, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.93, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.94, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.95, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.96, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.97, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.98, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.99, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[2.00, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[2.01, [\text{Float}(\infty), \text{Float}(\infty)]]]]$

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>
> $\#@\left\{x = \dfrac{8}{9}, y = \dfrac{7}{27}\right\}$

>

> $Dis2\left(F, x, y, \left[\dfrac{8}{9} + 0.1, \dfrac{7}{27} + 0.1\right], 0.01, 2\right)$

(40)

$[[0.01, [0.9888888889, 0.3592592593]], [0.02, [0.9830629630, 0.4065555556]], [0.03,$
$[0.9800575507, 0.4608528747]], [0.04, [0.9824923782, 0.5252955758]], [0.05,$
$[0.9950230824, 0.6055403919]], [0.06, [1.026815705, 0.7124088787]], [0.07,$
$[1.098194621, 0.8687129374]], [0.08, [1.261574689, 1.129977571]], [0.09,$
$[1.683730463, 1.663524559]], [0.10, [3.094777292, 3.171090227]], [0.11,$
$[10.95426639, 10.76840790]], [0.12, [138.1639979, 129.6500164]], [0.13,$
$[21394.50163, 20018.51286]], \left[0.14, \left[5.125368593 \times 10^{8}, 4.793448708 \times 10^{8}\right]\right], [0.15,$
$\left[2.939951680 \times 10^{17}, 2.750086340 \times 10^{17}\right]], \left[0.16, \left[9.675333988 \times 10^{34}, 9.049753008\right.\right.$
$\left.\left.\times 10^{34}\right]\right], \left[0.17, \left[1.047796258 \times 10^{70}, 9.800825424 \times 10^{69}\right]\right], [0.18, [1.228898175$
$\left.\times 10^{140}, 1.149463822 \times 10^{140}\right]], \left[0.19, \left[1.690388973 \times 10^{280}, 1.581134382 \times 10^{280}\right]\right],$
$\left[0.20, \left[3.198389021 \times 10^{560}, 2.991660166 \times 10^{560}\right]\right], \left[0.21, \left[1.145036218 \times 10^{1121},\right.\right.$
$\left.\left.1.071027667 \times 10^{1121}\right]\right], \left[0.22, \left[1.467559325 \times 10^{2242}, 1.372704073 \times 10^{2242}\right]\right], [0.23,$
$\left[2.410728543 \times 10^{4484}, 2.254912300 \times 10^{4484}\right]], \left[0.24, \left[6.505095856 \times 10^{8968},\right.\right.$
$\left.\left.6.084641673 \times 10^{8968}\right]\right], \left[0.25, \left[4.736575204 \times 10^{17937}, 4.430428791 \times 10^{17937}\right]\right], [0.26,$
$\left[2.511226753 \times 10^{35875}, 2.348914700 \times 10^{35875}\right]], \left[0.27, \left[7.058767958 \times 10^{71750},\right.\right.$
$\left.\left.6.602527599 \times 10^{71750}\right]\right], \left[0.28, \left[5.577182575 \times 10^{143501}, 5.216703819 \times 10^{143501}\right]\right],$
$\left[0.29, \left[3.481663325 \times 10^{287003}, 3.256627542 \times 10^{287003}\right]\right], [0.30, [1.356846113$
$\left.\times 10^{574007}, 1.269146960 \times 10^{574007}\right]], \left[0.31, \left[2.060716457 \times 10^{1148014}, 1.927522952\right.\right.$
$\left.\left.\times 10^{1148014}\right]\right], \left[0.32, \left[4.753281426 \times 10^{2296028}, 4.446055165 \times 10^{2296028}\right]\right], [0.33,$

$\left[2.528972495 \times 10^{4592057}, 2.365513465 \times 10^{4592057}\right]\right], \left[0.34, \left[7.158882948 \times 10^{9184114},\right.\right.$
$6.696171681 \times 10^{9184114}\right]\right], \left[0.35, \left[5.736507586 \times 10^{18368229}, 5.365730931 \times 10^{18368229}\right]\right],$
$\left[0.36, \left[3.683428075 \times 10^{36736459}, 3.445351315 \times 10^{36736459}\right]\right], \left[0.37, \left[1.518663088\right.\right.$
$\times 10^{73472919}, 1.420504965 \times 10^{73472919}\right]\right], \left[0.38, \left[2.581546334 \times 10^{146945838}, 2.414689218\right.\right.$
$\times 10^{146945838}\right]\right], \left[0.39, \left[7.459623324 \times 10^{293891676}, 6.977473833 \times 10^{293891676}\right]\right], \left[0.40,\right.$
$\left[6.228605795 \times 10^{587783353}, 5.826022589 \times 10^{587783353}\right]\right], \left[0.41, \left[4.342489135\right.\right.$
$\times 10^{1175566707}, 4.061814251 \times 10^{1175566707}\right]\right], \left[0.42, \left[2.110738980 \times 10^{2351133415},\right.\right.$
$1.974312290 \times 10^{2351133415}\right]\right], \left[0.43, \left[4.986847763 \times 10^{4702266830}, 4.664525042\right.\right.$
$\times 10^{4702266830}\right]\right], \left[0.44, \left[2.783615654 \times 10^{9404533661}, 2.603697876 \times 10^{9404533661}\right]\right],$
$\left[0.45, \left[8.673124686 \times 10^{18809067322}, 8.112541068 \times 10^{18809067322}\right]\right], \left[0.46, \left[8.419925117\right.\right.$
$\times 10^{37618134645}, 7.875706946 \times 10^{37618134645}\right]\right], \left[0.47, \left[7.935485596 \times 10^{75236269291},\right.\right.$
$7.422578960 \times 10^{75236269291}\right]\right], \left[0.48, \left[7.048619463 \times 10^{150472538583}, 6.593035032\right.\right.$
$\times 10^{150472538583}\right]\right], \left[0.49, \left[5.561157293 \times 10^{300945077167}, 5.201714328 \times 10^{300945077167}\right]\right],$
$\left[0.50, \left[3.461683893 \times 10^{601890154335}, 3.237939471 \times 10^{601890154335}\right]\right], \left[0.51,\right.$
$\left[1.341318344 \times 10^{1203780308671}, 1.254622821 \times 10^{1203780308671}\right]\right], \left[0.52, \left[2.013820594\right.\right.$
$\times 10^{2407560617342}, 1.883658182 \times 10^{2407560617342}\right]\right], \left[0.53, \left[4.539401585 \times 10^{4815121234684},\right.\right.$
$4.245999353 \times 10^{4815121234684}\right]\right], \left[0.54, \left[2.306504251 \times 10^{9630242469369}, 2.157424359\right.\right.$
$\times 10^{9630242469369}\right]\right], \left[0.55, \left[5.954777902 \times 10^{19260484938738}, 5.569893446\right.\right.$
$\times 10^{19260484938738}\right]\right], \left[0.56, \left[3.969064770 \times 10^{38520969877477}, 3.712526005\right.\right.$
$\times 10^{38520969877477}\right]\right], \left[0.57, \left[1.763329290 \times 10^{77041939754955}, 1.649357274\right.\right.$
$\times 10^{77041939754955}\right]\right], \left[0.58, \left[3.480357787 \times 10^{154083879509910}, 3.255406385\right.\right.$
$\times 10^{154083879509910}\right]\right], \left[0.59, \left[1.355828736 \times 10^{308167759019821}, 1.268195339\right.\right.$
$\times 10^{308167759019821}\right]\right], \left[0.60, \left[2.057627321 \times 10^{616335518039642}, 1.924633481\right.\right.$
$\times 10^{616335518039642}\right]\right], \left[0.61, \left[4.739041209 \times 10^{1232671036079284}, 4.432735358\right.\right.$
$\times 10^{1232671036079284}\right]\right], \left[0.62, \left[2.513842244 \times 10^{2465342072158569}, 2.351361150\right.\right.$
$\times 10^{2465342072158569}\right]\right], \left[0.63, \left[7.073479339 \times 10^{4930684144317138}, 6.616288100\right.\right.$
$\times 10^{4930684144317138}\right]\right], \left[0.64, \left[5.600453919 \times 10^{9861368288634277}, 5.238471031\right.\right.$
$\times 10^{9861368288634277}\right]\right], \left[0.65, \left[3.510779111 \times 10^{19722736577268555}, 3.283861441\right.\right.$
$\times 10^{19722736577268555}\right]\right], \left[0.66, \left[1.379634547 \times 10^{39445473154537111}, 1.290462472\right.\right.$
$\times 10^{39445473154537111}\right]\right], \left[0.67, \left[2.130517820 \times 10^{78890946309074222}, 1.992812733\right.\right.$
$\times 10^{78890946309074222}\right]\right], \left[0.68, \left[5.080744917 \times 10^{157781892618148444}, 4.752353195\right.\right.$
$\times 10^{157781892618148444}\right]\right], \left[0.69, \left[2.889427701 \times 10^{315563785236296889}, 2.702670808\right.\right.$

$\times 10^{315563785236296889}$]], [0.70, [9.345030296 $\times 10^{631127570472593778}$, 8.741018356 $\times 10^{631127570472593778}$]], [0.71, [9.775038504 $\times 10^{1262255140945187557}$, 9.143233172 $\times 10^{1262255140945187557}$]], [0.72, [1.069532542 $\times 10^{2524510281890375116}$, 1.000403774 $\times 10^{2524510281890375116}$]], [0.73, [1.280398201 $\times 10^{5049020563780750232}$, 1.197640225 $\times 10^{5049020563780750232}$]], [0.74, [Float($\infty$), Float($\infty$)]], [0.75, [Float($\infty$), Float($\infty$)]], [0.76, [Float($\infty$), Float($\infty$)]], [0.77, [Float($\infty$), Float($\infty$)]], [0.78, [Float($\infty$), Float($\infty$)]], [0.79, [Float($\infty$), Float($\infty$)]], [0.80, [Float($\infty$), Float($\infty$)]], [0.81, [Float($\infty$), Float($\infty$)]], [0.82, [Float($\infty$), Float($\infty$)]], [0.83, [Float($\infty$), Float($\infty$)]], [0.84, [Float($\infty$), Float($\infty$)]], [0.85, [Float($\infty$), Float($\infty$)]], [0.86, [Float($\infty$), Float($\infty$)]], [0.87, [Float($\infty$), Float($\infty$)]], [0.88, [Float($\infty$), Float($\infty$)]], [0.89, [Float($\infty$), Float($\infty$)]], [0.90, [Float($\infty$), Float($\infty$)]], [0.91, [Float($\infty$), Float($\infty$)]], [0.92, [Float($\infty$), Float($\infty$)]], [0.93, [Float($\infty$), Float($\infty$)]], [0.94, [Float($\infty$), Float($\infty$)]], [0.95, [Float($\infty$), Float($\infty$)]], [0.96, [Float($\infty$), Float($\infty$)]], [0.97, [Float($\infty$), Float($\infty$)]], [0.98, [Float($\infty$), Float($\infty$)]], [0.99, [Float($\infty$), Float($\infty$)]], [1.00, [Float($\infty$), Float($\infty$)]], [1.01, [Float($\infty$), Float($\infty$)]], [1.02, [Float($\infty$), Float($\infty$)]], [1.03, [Float($\infty$), Float($\infty$)]], [1.04, [Float($\infty$), Float($\infty$)]], [1.05, [Float($\infty$), Float($\infty$)]], [1.06, [Float($\infty$), Float($\infty$)]], [1.07, [Float($\infty$), Float($\infty$)]], [1.08, [Float($\infty$), Float($\infty$)]], [1.09, [Float($\infty$), Float($\infty$)]], [1.10, [Float($\infty$), Float($\infty$)]], [1.11, [Float($\infty$), Float($\infty$)]], [1.12, [Float($\infty$), Float($\infty$)]], [1.13, [Float($\infty$), Float($\infty$)]], [1.14, [Float($\infty$), Float($\infty$)]], [1.15, [Float($\infty$), Float($\infty$)]], [1.16, [Float($\infty$), Float($\infty$)]], [1.17, [Float($\infty$), Float($\infty$)]], [1.18, [Float($\infty$), Float($\infty$)]], [1.19, [Float($\infty$), Float($\infty$)]], [1.20, [Float($\infty$), Float($\infty$)]], [1.21, [Float($\infty$), Float($\infty$)]], [1.22, [Float($\infty$), Float($\infty$)]], [1.23, [Float($\infty$), Float($\infty$)]], [1.24, [Float($\infty$), Float($\infty$)]], [1.25, [Float($\infty$), Float($\infty$)]], [1.26, [Float($\infty$), Float($\infty$)]], [1.27, [Float($\infty$), Float($\infty$)]], [1.28, [Float($\infty$), Float($\infty$)]], [1.29, [Float($\infty$), Float($\infty$)]], [1.30, [Float($\infty$), Float($\infty$)]], [1.31, [Float($\infty$), Float($\infty$)]], [1.32, [Float($\infty$), Float($\infty$)]], [1.33, [Float($\infty$), Float($\infty$)]], [1.34, [Float($\infty$), Float($\infty$)]], [1.35, [Float($\infty$), Float($\infty$)]], [1.36, [Float($\infty$), Float($\infty$)]], [1.37, [Float($\infty$), Float($\infty$)]], [1.38, [Float($\infty$), Float($\infty$)]], [1.39, [Float($\infty$), Float($\infty$)]], [1.40, [Float($\infty$), Float($\infty$)]], [1.41, [Float($\infty$), Float($\infty$)]], [1.42, [Float($\infty$), Float($\infty$)]], [1.43, [Float($\infty$), Float($\infty$)]], [1.44, [Float($\infty$), Float($\infty$)]], [1.45, [Float($\infty$), Float($\infty$)]], [1.46, [Float($\infty$), Float($\infty$)]], [1.47, [Float($\infty$), Float($\infty$)]], [1.48, [Float($\infty$), Float($\infty$)]], [1.49, [Float($\infty$), Float($\infty$)]], [1.50, [Float($\infty$), Float($\infty$)]], [1.51, [Float($\infty$), Float($\infty$)]], [1.52, [Float($\infty$), Float($\infty$)]], [1.53, [Float($\infty$), Float($\infty$)]], [1.54, [Float($\infty$), Float($\infty$)]], [1.55, [Float($\infty$), Float($\infty$)]], [1.56, [Float($\infty$), Float($\infty$)]], [1.57, [Float($\infty$), Float($\infty$)]], [1.58, [Float($\infty$), Float($\infty$)]], [1.59, [Float($\infty$), Float($\infty$)]], [1.60, [Float($\infty$), Float($\infty$)]], [1.61, [

$\text{Float}(\infty), \text{Float}(\infty)]], [1.62, [\text{Float}(\infty), \text{Float}(\infty)]], [1.63, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.64, [\text{Float}(\infty), \text{Float}(\infty)]], [1.65, [\text{Float}(\infty), \text{Float}(\infty)]], [1.66, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [1.67, [\text{Float}(\infty), \text{Float}(\infty)]], [1.68, [\text{Float}(\infty), \text{Float}(\infty)]], [1.69, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [1.70, [\text{Float}(\infty), \text{Float}(\infty)]], [1.71, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.72, [\text{Float}(\infty), \text{Float}(\infty)]], [1.73, [\text{Float}(\infty), \text{Float}(\infty)]], [1.74, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [1.75, [\text{Float}(\infty), \text{Float}(\infty)]], [1.76, [\text{Float}(\infty), \text{Float}(\infty)]], [1.77, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [1.78, [\text{Float}(\infty), \text{Float}(\infty)]], [1.79, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.80, [\text{Float}(\infty), \text{Float}(\infty)]], [1.81, [\text{Float}(\infty), \text{Float}(\infty)]], [1.82, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [1.83, [\text{Float}(\infty), \text{Float}(\infty)]], [1.84, [\text{Float}(\infty), \text{Float}(\infty)]], [1.85, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [1.86, [\text{Float}(\infty), \text{Float}(\infty)]], [1.87, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.88, [\text{Float}(\infty), \text{Float}(\infty)]], [1.89, [\text{Float}(\infty), \text{Float}(\infty)]], [1.90, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [1.91, [\text{Float}(\infty), \text{Float}(\infty)]], [1.92, [\text{Float}(\infty), \text{Float}(\infty)]], [1.93, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [1.94, [\text{Float}(\infty), \text{Float}(\infty)]], [1.95, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.96, [\text{Float}(\infty), \text{Float}(\infty)]], [1.97, [\text{Float}(\infty), \text{Float}(\infty)]], [1.98, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [1.99, [\text{Float}(\infty), \text{Float}(\infty)]], [2.00, [\text{Float}(\infty), \text{Float}(\infty)]], [2.01, [$
$\text{Float}(\infty), \text{Float}(\infty)]]]$

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> $\#@ \left\{ x = \dfrac{28}{37}, y = \dfrac{21}{37} \right\}$

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>

> $Dis2\left(F, x, y, \left[\dfrac{28}{37} + 0.1, \dfrac{21}{37} + 0.1 \right], 0.01, 2 \right)$

$[[0.01, [0.8567567568, 0.6675675676]], [0.02, [0.8819378379, 0.7223513514]], [0.03,$ **(41)**
$[0.9254053714, 0.8014932313]], [0.04, [1.004847920, 0.9249713331]], [0.05,$
$[1.164674579, 1.139959101]], [0.06, [1.540369161, 1.582945347]], [0.07,$
$[2.687434319, 2.790733527]], [0.08, [8.318082576, 8.256277468]], [0.09,$
$[79.88208441, 75.27654086]], [0.10, [7173.938760, 6709.125608]], [0.11, [5.759278462$
$\times 10^7, 5.387591339 \times 10^7]], [0.12, [3.713173332 \times 10^{15}, 3.473020068 \times 10^{15}]], [0.13,$
$[1.543211201 \times 10^{31}, 1.443493637 \times 10^{31}]], [0.14, [2.665736366 \times 10^{62}, 2.493417664$
$\times 10^{62}]], [0.15, [7.954033909 \times 10^{124}, 7.439953799 \times 10^{124}]], [0.16, [7.081636477$
$\times 10^{249}, 6.623908390 \times 10^{249}]], [0.17, [5.613368888 \times 10^{499}, 5.250554491 \times 10^{499}]],$
$[0.18, [3.526992403 \times 10^{999}, 3.299025928 \times 10^{999}]], [0.19, [1.392406259 \times 10^{1999},$
$1.302408836 \times 10^{1999}]], [0.20, [2.170146431 \times 10^{3998}, 2.029879870 \times 10^{3998}]], [0.21,$

$\left[5.271510835 \times 10^{7996}, 4.930789142 \times 10^{7996}\right]\right], \left[0.22, \left[3.110478950 \times 10^{15993}, 2.909434480 \times 10^{15993}\right]\right], \left[0.23, \left[1.082957911 \times 10^{31987}, 1.012961405 \times 10^{31987}\right]\right], \left[0.24, \left[1.312744501 \times 10^{63974}, 1.227895833 \times 10^{63974}\right]\right], \left[0.25, \left[1.928934426 \times 10^{127948}, 1.804258596 \times 10^{127948}\right]\right], \left[0.26, \left[4.164779164 \times 10^{255896}, 3.895590486 \times 10^{255896}\right]\right], \left[0.27, \left[1.941516141 \times 10^{511793}, 1.816027096 \times 10^{511793}\right]\right], \left[0.28, \left[4.219286930 \times 10^{1023586}, 3.946575170 \times 10^{1023586}\right]\right], \left[0.29, \left[1.992669027 \times 10^{2047173}, 1.863873737 \times 10^{2047173}\right]\right], \left[0.30, \left[4.444545846 \times 10^{4094346}, 4.157274569 \times 10^{4094346}\right]\right], \left[0.31, \left[2.211117540 \times 10^{8188693}, 2.068202927 \times 10^{8188693}\right]\right], \left[0.32, \left[5.472436224 \times 10^{16377386}, 5.118727706 \times 10^{16377386}\right]\right], \left[0.33, \left[3.352211589 \times 10^{32754773}, 3.135449324 \times 10^{32754773}\right]\right], \left[0.34, \left[1.257749010 \times 10^{65509547}, 1.176454954 \times 10^{65509547}\right]\right], \left[0.35, \left[1.770700125 \times 10^{131019094}, 1.656251697 \times 10^{131019094}\right]\right], \left[0.36, \left[3.509514856 \times 10^{262038188}, 3.282678902 \times 10^{262038188}\right]\right], \left[0.37, \left[1.378641095 \times 10^{524076377}, 1.289533232 \times 10^{524076377}\right]\right], \left[0.38, \left[2.127450624 \times 10^{1048152754}, 1.989943785 \times 10^{1048152754}\right]\right], \left[0.39, \left[5.066126483 \times 10^{2096305508}, 4.738679612 \times 10^{2096305508}\right]\right], \left[0.40, \left[2.872824565 \times 10^{4192611017}, 2.687140809 \times 10^{4192611017}\right]\right], \left[0.41, \left[9.237942632 \times 10^{8385222034}, 8.640852259 \times 10^{8385222034}\right]\right], \left[0.42, \left[9.552291597 \times 10^{16770444069}, 8.934883413 \times 10^{16770444069}\right]\right], \left[0.43, \left[1.021344354 \times 10^{33540888140}, 9.553302082 \times 10^{33540888139}\right]\right], \left[0.44, \left[1.167619754 \times 10^{67081776280}, 1.092151162 \times 10^{67081776280}\right]\right], \left[0.45, \left[1.526018915 \times 10^{134163552560}, 1.427385351 \times 10^{134163552560}\right]\right], \left[0.46, \left[2.606614957 \times 10^{268327105120}, 2.438137539 \times 10^{268327105120}\right]\right], \left[0.47, \left[7.605203069 \times 10^{536654210240}, 7.113644107 \times 10^{536654210240}\right]\right], \left[0.48, \left[6.474089210 \times 10^{1073308420481}, 6.055639287 \times 10^{1073308420481}\right]\right], \left[0.49, \left[4.691529032 \times 10^{2146616840963}, 4.388294109 \times 10^{2146616840963}\right]\right], \left[0.50, \left[2.463688894 \times 10^{4293233681927}, 2.304449441 \times 10^{4293233681927}\right]\right], \left[0.51, \left[6.794050663 \times 10^{8586467363854}, 6.354920170 \times 10^{8586467363854}\right]\right], \left[0.52, \left[5.166716250 \times 10^{17172934727709}, 4.832767809 \times 10^{17172934727709}\right]\right], \left[0.53, \left[2.988039071 \times 10^{34345869455419}, 2.794908475 \times 10^{34345869455419}\right]\right], \left[0.54, \left[9.993775594 \times 10^{68691738910838}, 9.347832289 \times 10^{68691738910838}\right]\right], \left[0.55, \left[1.117934184 \times 10^{137383477821678}, 1.045676998 \times 10^{137383477821678}\right]\right], \left[0.56, \left[1.398909186 \times 10^{274766955643356}, 1.308491302 \times 10^{274766955643356}\right]\right], \left[0.57, \left[2.190463863 \times 10^{549533911286712}, 2.048884193 \times 10^{549533911286712}\right]\right], \left[0.58, \left[5.370679494 \times 10^{1099067822573424}, 5.023547973 \times 10^{1099067822573424}\right]\right], \left[0.59, \left[3.228609502 \times 10^{2198135645146849}, 3.019929741\right.$

$\times 10^{2198135645146849}]], [0.60, [1.166777621 \times 10^{4396271290293699}, 1.091363460$
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$\times 10^{17585085161174796}]], [0.63, [7.561432338 \times 10^{35170170322349592}, 7.072702479$
$\times 10^{35170170322349592}]], [0.64, [6.399782148 \times 10^{70340340644699185}, 5.986135030$
$\times 10^{70340340644699185}]], [0.65, [4.584452006 \times 10^{140680681289398371}, 4.288137959$
$\times 10^{140680681289398371}]], [0.66, [2.352512341 \times 10^{281361362578796743}, 2.200458737$
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$\times 10^{562722725157593486}]], [0.68, [4.295352300 \times 10^{1125445450315186973}, 4.017724083$
$\times 10^{1125445450315186973}]], [0.69, [2.065164396 \times 10^{2250890900630373947}, 1.931683401$
$\times 10^{2250890900630373947}]], [0.70, [4.773822950 \times 10^{4501781801260747894}, 4.465268991$
$\times 10^{4501781801260747894}]], [0.71, [2.550877864 \times 10^{9003563602521495789}, 2.386002991$
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$\text{Float}(\infty), \text{Float}(\infty)]], [0.80, [\text{Float}(\infty), \text{Float}(\infty)]], [0.81, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[0.82, [\text{Float}(\infty), \text{Float}(\infty)]], [0.83, [\text{Float}(\infty), \text{Float}(\infty)]], [0.84, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [0.85, [\text{Float}(\infty), \text{Float}(\infty)]], [0.86, [\text{Float}(\infty), \text{Float}(\infty)]], [0.87, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [0.88, [\text{Float}(\infty), \text{Float}(\infty)]], [0.89, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[0.90, [\text{Float}(\infty), \text{Float}(\infty)]], [0.91, [\text{Float}(\infty), \text{Float}(\infty)]], [0.92, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [0.93, [\text{Float}(\infty), \text{Float}(\infty)]], [0.94, [\text{Float}(\infty), \text{Float}(\infty)]], [0.95, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [0.96, [\text{Float}(\infty), \text{Float}(\infty)]], [0.97, [\text{Float}(\infty), \text{Float}(\infty)]],$
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$\text{Float}(\infty)]], [1.01, [\text{Float}(\infty), \text{Float}(\infty)]], [1.02, [\text{Float}(\infty), \text{Float}(\infty)]], [1.03, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [1.04, [\text{Float}(\infty), \text{Float}(\infty)]], [1.05, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.06, [\text{Float}(\infty), \text{Float}(\infty)]], [1.07, [\text{Float}(\infty), \text{Float}(\infty)]], [1.08, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [1.09, [\text{Float}(\infty), \text{Float}(\infty)]], [1.10, [\text{Float}(\infty), \text{Float}(\infty)]], [1.11, [$
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$\text{Float}(\infty)]], [1.17, [\text{Float}(\infty), \text{Float}(\infty)]], [1.18, [\text{Float}(\infty), \text{Float}(\infty)]], [1.19, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [1.20, [\text{Float}(\infty), \text{Float}(\infty)]], [1.21, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.22, [\text{Float}(\infty), \text{Float}(\infty)]], [1.23, [\text{Float}(\infty), \text{Float}(\infty)]], [1.24, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [1.25, [\text{Float}(\infty), \text{Float}(\infty)]], [1.26, [\text{Float}(\infty), \text{Float}(\infty)]], [1.27, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [1.28, [\text{Float}(\infty), \text{Float}(\infty)]], [1.29, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.30, [\text{Float}(\infty), \text{Float}(\infty)]], [1.31, [\text{Float}(\infty), \text{Float}(\infty)]], [1.32, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [1.33, [\text{Float}(\infty), \text{Float}(\infty)]], [1.34, [\text{Float}(\infty), \text{Float}(\infty)]], [1.35, [$

Float(∞), Float(∞)]], [1.36, [Float(∞), Float(∞)]], [1.37, [Float(∞), Float(∞)]], [1.38, [Float(∞), Float(∞)]], [1.39, [Float(∞), Float(∞)]], [1.40, [Float(∞), Float(∞)]], [1.41, [Float(∞), Float(∞)]], [1.42, [Float(∞), Float(∞)]], [1.43, [Float(∞), Float(∞)]], [1.44, [Float(∞), Float(∞)]], [1.45, [Float(∞), Float(∞)]], [1.46, [Float(∞), Float(∞)]], [1.47, [Float(∞), Float(∞)]], [1.48, [Float(∞), Float(∞)]], [1.49, [Float(∞), Float(∞)]], [1.50, [Float(∞), Float(∞)]], [1.51, [Float(∞), Float(∞)]], [1.52, [Float(∞), Float(∞)]], [1.53, [Float(∞), Float(∞)]], [1.54, [Float(∞), Float(∞)]], [1.55, [Float(∞), Float(∞)]], [1.56, [Float(∞), Float(∞)]], [1.57, [Float(∞), Float(∞)]], [1.58, [Float(∞), Float(∞)]], [1.59, [Float(∞), Float(∞)]], [1.60, [Float(∞), Float(∞)]], [1.61, [Float(∞), Float(∞)]], [1.62, [Float(∞), Float(∞)]], [1.63, [Float(∞), Float(∞)]], [1.64, [Float(∞), Float(∞)]], [1.65, [Float(∞), Float(∞)]], [1.66, [Float(∞), Float(∞)]], [1.67, [Float(∞), Float(∞)]], [1.68, [Float(∞), Float(∞)]], [1.69, [Float(∞), Float(∞)]], [1.70, [Float(∞), Float(∞)]], [1.71, [Float(∞), Float(∞)]], [1.72, [Float(∞), Float(∞)]], [1.73, [Float(∞), Float(∞)]], [1.74, [Float(∞), Float(∞)]], [1.75, [Float(∞), Float(∞)]], [1.76, [Float(∞), Float(∞)]], [1.77, [Float(∞), Float(∞)]], [1.78, [Float(∞), Float(∞)]], [1.79, [Float(∞), Float(∞)]], [1.80, [Float(∞), Float(∞)]], [1.81, [Float(∞), Float(∞)]], [1.82, [Float(∞), Float(∞)]], [1.83, [Float(∞), Float(∞)]], [1.84, [Float(∞), Float(∞)]], [1.85, [Float(∞), Float(∞)]], [1.86, [Float(∞), Float(∞)]], [1.87, [Float(∞), Float(∞)]], [1.88, [Float(∞), Float(∞)]], [1.89, [Float(∞), Float(∞)]], [1.90, [Float(∞), Float(∞)]], [1.91, [Float(∞), Float(∞)]], [1.92, [Float(∞), Float(∞)]], [1.93, [Float(∞), Float(∞)]], [1.94, [Float(∞), Float(∞)]], [1.95, [Float(∞), Float(∞)]], [1.96, [Float(∞), Float(∞)]], [1.97, [Float(∞), Float(∞)]], [1.98, [Float(∞), Float(∞)]], [1.99, [Float(∞), Float(∞)]], [2.00, [Float(∞), Float(∞)]], [2.01, [Float(∞), Float(∞)]]]]

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>
>
> $F := RandNice([x, y], 8)$
$$F := [(5 - 7x - 7y)(2 - 5x - 8y), (6 - 2x - 3y)(4 - 4x - 6y)] \tag{42}$$

> #(i)
>

> $sys := \{(5 - 7 \cdot x - 7 \cdot y) \cdot (2 - 5 \cdot x - 8 \cdot y) = 0, (6 - 2 \cdot x - 3 \cdot y) \cdot (4 - 4 \cdot x - 6 \cdot y) = 0\}$

$$sys := \{(5 - 7\,x - 7\,y)\,(2 - 5\,x - 8\,y) = 0,\ (6 - 2\,x - 3\,y)\,(4 - 4\,x - 6\,y) = 0\} \tag{43}$$

> $solve(sys, \{x, y\})$

$$\left\{x = \frac{1}{7}, y = \frac{4}{7}\right\},\ \{x = 10, y = -6\},\ \left\{x = -\frac{27}{7}, y = \frac{32}{7}\right\},\ \{x = 42, y = -26\} \tag{44}$$

> #These are the equilibrium points.
>
>
> #(ii)
>
> $J := Matrix([\,[\,diff\,(F[1], x), diff\,(F[1], y)\,], [\,diff\,(F[2], x), diff\,(F[2], y)\,]\,])$

$$J := \begin{bmatrix} -39 + 70\,x + 91\,y & -54 + 91\,x + 112\,y \\ -32 + 16\,x + 24\,y & -48 + 24\,x + 36\,y \end{bmatrix} \tag{45}$$

>
>
>
> #@ $\left\{x = \dfrac{1}{7}, y = \dfrac{4}{7}\right\}$

> $J := subs\left(x = \dfrac{1}{7}, J\right)$

$$J := \begin{bmatrix} -29 + 91\,y & -41 + 112\,y \\ -\dfrac{208}{7} + 24\,y & -\dfrac{312}{7} + 36\,y \end{bmatrix} \tag{46}$$

> $J := subs\left(y = \dfrac{4}{7}, J\right)$

$$J := \begin{bmatrix} 23 & 23 \\ -16 & -24 \end{bmatrix} \tag{47}$$

> $evalf\,(Eigenvalues(J)\,)$

$$\begin{bmatrix} 13.07387196 \\ -14.07387196 \end{bmatrix} \tag{48}$$

> #This point is not stable.
>
>
>
> #@ $\{x = 10, y = -6\}$
>
> $J := Matrix([\,[\,diff\,(F[1], x), diff\,(F[1], y)\,], [\,diff\,(F[2], x), diff\,(F[2], y)\,]\,])$

$$J := \begin{bmatrix} -39 + 70\,x + 91\,y & -54 + 91\,x + 112\,y \\ -32 + 16\,x + 24\,y & -48 + 24\,x + 36\,y \end{bmatrix} \tag{49}$$

> $J := subs(x = 10, J)$

$$J := \begin{bmatrix} 661 + 91\,y & 856 + 112\,y \\ 128 + 24\,y & 192 + 36\,y \end{bmatrix} \tag{50}$$

> $J := subs(y = -6, J)$

$$J := \begin{bmatrix} 115 & 184 \\ -16 & -24 \end{bmatrix} \tag{51}$$

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} 88.93097972 \\ 2.06902028 \end{bmatrix} \tag{52}$$

> #This point is not stable.
>
>
>
>
> $\#@ \left\{ x = -\dfrac{27}{7}, y = \dfrac{32}{7} \right\}$
>
>
>
> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$

$$J := \begin{bmatrix} -39 + 70\,x + 91\,y & -54 + 91\,x + 112\,y \\ -32 + 16\,x + 24\,y & -48 + 24\,x + 36\,y \end{bmatrix} \tag{53}$$

> $J := subs\left(x = -\dfrac{27}{7}, J\right)$

$$J := \begin{bmatrix} -309 + 91\,y & -405 + 112\,y \\ -\dfrac{656}{7} + 24\,y & -\dfrac{984}{7} + 36\,y \end{bmatrix} \tag{54}$$

> $J := subs\left(y = \dfrac{32}{7}, J\right)$

$$J := \begin{bmatrix} 107 & 107 \\ 16 & 24 \end{bmatrix} \tag{55}$$

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} 124.1024744 \\ 6.89752565 \end{bmatrix} \tag{56}$$

> #This point is not stable.
>
>

>

> #@ $\{x = 42, y = -26\}$

>

>

> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$

$$J := \begin{bmatrix} -39 + 70\,x + 91\,y & -54 + 91\,x + 112\,y \\ -32 + 16\,x + 24\,y & -48 + 24\,x + 36\,y \end{bmatrix} \tag{57}$$

> $J := subs(x = 42, J)$

$$J := \begin{bmatrix} 2901 + 91\,y & 3768 + 112\,y \\ 640 + 24\,y & 960 + 36\,y \end{bmatrix} \tag{58}$$

> $J := subs(y = -26, J)$

$$J := \begin{bmatrix} 535 & 856 \\ 16 & 24 \end{bmatrix} \tag{59}$$

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} 560.5271339 \\ -1.5271339 \end{bmatrix} \tag{60}$$

> #This point is not stable.

>

>

>

>

>

>

>

>

>

> #(iii)

>

> #@ $\left\{ x = \dfrac{1}{7}, y = \dfrac{4}{7} \right\}$

>

>

>

> $Dis2\left(F, x, y, \left[\dfrac{1}{7} + 0.1, \dfrac{4}{7} + 0.1\right], 0.01, 2\right)$

$[[0.01, [0.2428571429, 0.6714285714]], [0.02, [0.3070571429, 0.6364285714]], [0.03,$ **(61)**

$\quad [0.3812881469, 0.6000355226]], [0.04, [0.4692693407, 0.5613531337]], [0.05,$

$\quad [0.5763816080, 0.5192978545]], [0.06, [0.7108382978, 0.4725459733]], [0.07,$

$\quad [0.8860086818, 0.4194897892]], [0.08, [1.125460088, 0.3582889088]], [0.09,$

$[1.475221793, 0.2873801748]], [0.10, [2.038440734, 0.2080826691]], [0.11,$
$[3.095654940, 0.1379143199]], [0.12, [5.667115993, 0.1936403258]], [0.13,$
$[15.71266214, 1.366633255]], [0.14, [115.9441958, 21.16342828]], [0.15,$
$[7248.223059, 1719.114090]], [0.16, [3.138542452 \times 10^7, 7.724002709 \times 10^6]], [0.17,$
$[5.987786470 \times 10^{14}, 1.477234880 \times 10^{14}]], [0.18, [2.182008420 \times 10^{29}, 5.383975152$
$\times 10^{28}]], [0.19, [2.897791516 \times 10^{58}, 7.150188975 \times 10^{57}]], [0.20, [5.110817499$
$\times 10^{116}, 1.261075184 \times 10^{116}]], [0.21, [1.589779723 \times 10^{233}, 3.922722380 \times 10^{232}]],$
$[0.22, [1.538261323 \times 10^{466}, 3.795602649 \times 10^{465}]], [0.23, [1.440178937 \times 10^{932},$
$3.553588009 \times 10^{931}]], [0.24, [1.262377148 \times 10^{1864}, 3.114868700 \times 10^{1863}]], [0.25,$
$[9.699167570 \times 10^{3727}, 2.393233553 \times 10^{3727}]], [0.26, [5.725654514 \times 10^{7455},$
$1.412783974 \times 10^{7455}]], [0.27, [1.995292143 \times 10^{14911}, 4.923309215 \times 10^{14910}]], [0.28,$
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$8.817495216 \times 10^{59643}]], [0.30, [7.772226319 \times 10^{119288}, 1.917767962 \times 10^{119288}]],$
$[0.31, [3.676605993 \times 10^{238577}, 9.071888662 \times 10^{238576}]], [0.32, [8.227168565$
$\times 10^{477154}, 2.030023270 \times 10^{477154}]], [0.33, [4.119618552 \times 10^{954309}, 1.016500569$
$\times 10^{954309}]], [0.34, [1.032928415 \times 10^{1908619}, 2.548712478 \times 10^{1908618}]], [0.35,$
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$6.332863999 \times 10^{7634474}]], [0.37, [4.009177603 \times 10^{15268950}, 9.892496748 \times 10^{15268949}]],$
$[0.38, [9.782881776 \times 10^{30537900}, 2.413889723 \times 10^{30537900}]], [0.39, [5.824918113$
$\times 10^{61075801}, 1.437276898 \times 10^{61075801}]], [0.40, [2.065075160 \times 10^{122151603}, 5.095496217$
$\times 10^{122151602}]], [0.41, [2.595541275 \times 10^{244303206}, 6.404401643 \times 10^{244303205}]], [0.42,$
$[4.100266577 \times 10^{488606412}, 1.011725541 \times 10^{488606412}]], [0.43, [1.023246812$
$\times 10^{977212825}, 2.524823485 \times 10^{977212824}]], [0.44, [6.372605217 \times 10^{1954425649},$
$1.572416656 \times 10^{1954425649}]], [0.45, [2.471668619 \times 10^{3908851299}, 6.098750466$
$\times 10^{3908851298}]], [0.46, [3.718233861 \times 10^{7817702598}, 9.174603877 \times 10^{7817702597}]],$
$[0.47, [8.414525233 \times 10^{15635405196}, 2.076252831 \times 10^{15635405196}]], [0.48, [4.309386514$
$\times 10^{31270810393}, 1.063325108 \times 10^{31270810393}]], [0.49, [1.130282779 \times 10^{62541620787},$
$2.788930753 \times 10^{62541620786}]], [0.50, [7.775537773 \times 10^{125083241573}, 1.918585050$
$\times 10^{125083241573}]], [0.51, [3.679739587 \times 10^{250166483147}, 9.079620687 \times 10^{250166483146}]],$
$[0.52, [8.241198678 \times 10^{500332966294}, 2.033485148 \times 10^{500332966294}]], [0.53,$
$[4.133681227 \times 10^{1000665932589}, 1.019970481 \times 10^{1000665932589}]], [0.54, [1.039992433$
$\times 10^{2001331865179}, 2.566142680 \times 10^{2001331865178}]], [0.55, [6.582889617 \times 10^{4002663730357},$

$1.624303550 \times 10^{4002663730357}$]], [0.56, [$2.637481122 \times 10^{8005327460715}$, 6.507886654 $\times 10^{8005327460714}$]], [0.57, [$4.233844795 \times 10^{16010654921430}$, 1.044685470 $\times 10^{16010654921430}$]], [0.58, [$1.091003343 \times 10^{32021309842861}$, 2.692010205 $\times 10^{32021309842860}$]], [0.59, [$7.244499333 \times 10^{64042619685721}$, 1.787553289 $\times 10^{64042619685721}$]], [0.60, [$3.194279892 \times 10^{128085239371443}$, 7.881766932 $\times 10^{128085239371442}$]], [0.61, [$6.210150845 \times 10^{256170478742886}$, 1.532331644 $\times 10^{256170478742886}$]], [0.62, [$2.347256298 \times 10^{512340957485773}$, 5.791767685 $\times 10^{512340957485772}$]], [0.63, [$3.353337303 \times 10^{1024681914971546}$, 8.274235176 $\times 10^{1024681914971545}$]], [0.64, [$6.844010927 \times 10^{2049363829943092}$, 1.688734263 $\times 10^{2049363829943092}$]], [0.65, [$2.850871239 \times 10^{4098727659886185}$, 7.034418839 $\times 10^{4098727659886184}$]], [0.66, [$4.946652693 \times 10^{8197455319772370}$, 1.220568169 $\times 10^{8197455319772370}$]], [0.67, [$1.489289243 \times 10^{16394910639544741}$, 3.674765862 $\times 10^{16394910639544740}$]], [0.68, [$1.349939543 \times 10^{32789821279089482}$, 3.330925659 $\times 10^{32789821279089481}$]], [0.69, [$1.109136129 \times 10^{65579642558178964}$, 2.736752182 $\times 10^{65579642558178963}$]], [0.70, [$7.487311791 \times 10^{131159285116357927}$, 1.847466360 $\times 10^{131159285116357927}$]], [0.71, [$3.411992371 \times 10^{262318570232715855}$, 8.418964377 $\times 10^{262318570232715854}$]], [0.72, [$7.085529605 \times 10^{524637140465431710}$, 1.748328099 $\times 10^{524637140465431710}$]], [0.73, [$3.055630582 \times 10^{1049274280930863421}$, 7.539654910 $\times 10^{1049274280930863420}$]], [0.74, [$5.682741619 \times 10^{2098548561861726842}$, 1.402195377 $\times 10^{2098548561861726842}$]], [0.75, [$1.965495413 \times 10^{4197097123723453685}$, 4.849786889 $\times 10^{4197097123723453684}$]], [0.76, [$2.351257984 \times 10^{8394194247446907370}$, 5.801641696 $\times 10^{8394194247446907369}$]], [0.77, [Float($\infty$), Float($\infty$)]], [0.78, [Float($\infty$), Float($\infty$)]], [0.79, [Float($\infty$), Float($\infty$)]], [0.80, [Float($\infty$), Float($\infty$)]], [0.81, [Float($\infty$), Float($\infty$)]], [0.82, [Float($\infty$), Float($\infty$)]], [0.83, [Float($\infty$), Float($\infty$)]], [0.84, [Float($\infty$), Float($\infty$)]], [0.85, [Float($\infty$), Float($\infty$)]], [0.86, [Float($\infty$), Float($\infty$)]], [0.87, [Float($\infty$), Float($\infty$)]], [0.88, [Float($\infty$), Float($\infty$)]], [0.89, [Float($\infty$), Float($\infty$)]], [0.90, [Float($\infty$), Float($\infty$)]], [0.91, [Float($\infty$), Float($\infty$)]], [0.92, [Float($\infty$), Float($\infty$)]], [0.93, [Float($\infty$), Float($\infty$)]], [0.94, [Float($\infty$), Float($\infty$)]], [0.95, [Float($\infty$), Float($\infty$)]], [0.96, [Float($\infty$), Float($\infty$)]], [0.97, [Float($\infty$), Float($\infty$)]], [0.98, [Float($\infty$), Float($\infty$)]], [0.99, [Float($\infty$), Float($\infty$)]], [1.00, [Float($\infty$), Float($\infty$)]], [1.01, [Float($\infty$), Float($\infty$)]], [1.02, [Float($\infty$), Float($\infty$)]], [1.03, [Float($\infty$), Float($\infty$)]], [1.04, [Float($\infty$), Float($\infty$)]], [1.05, [Float($\infty$), Float($\infty$)]], [1.06, [Float($\infty$), Float($\infty$)]], [1.07, [Float($\infty$), Float($\infty$)]], [1.08, [Float($\infty$), Float($\infty$)]], [1.09, [Float($\infty$), Float($\infty$)]], [1.10, [Float($\infty$), Float($\infty$)]],

[1.11, [Float(∞), Float(∞)]], [1.12, [Float(∞), Float(∞)]], [1.13, [Float(∞), Float(∞)]], [1.14, [Float(∞), Float(∞)]], [1.15, [Float(∞), Float(∞)]], [1.16, [Float(∞), Float(∞)]], [1.17, [Float(∞), Float(∞)]], [1.18, [Float(∞), Float(∞)]], [1.19, [Float(∞), Float(∞)]], [1.20, [Float(∞), Float(∞)]], [1.21, [Float(∞), Float(∞)]], [1.22, [Float(∞), Float(∞)]], [1.23, [Float(∞), Float(∞)]], [1.24, [Float(∞), Float(∞)]], [1.25, [Float(∞), Float(∞)]], [1.26, [Float(∞), Float(∞)]], [1.27, [Float(∞), Float(∞)]], [1.28, [Float(∞), Float(∞)]], [1.29, [Float(∞), Float(∞)]], [1.30, [Float(∞), Float(∞)]], [1.31, [Float(∞), Float(∞)]], [1.32, [Float(∞), Float(∞)]], [1.33, [Float(∞), Float(∞)]], [1.34, [Float(∞), Float(∞)]], [1.35, [Float(∞), Float(∞)]], [1.36, [Float(∞), Float(∞)]], [1.37, [Float(∞), Float(∞)]], [1.38, [Float(∞), Float(∞)]], [1.39, [Float(∞), Float(∞)]], [1.40, [Float(∞), Float(∞)]], [1.41, [Float(∞), Float(∞)]], [1.42, [Float(∞), Float(∞)]], [1.43, [Float(∞), Float(∞)]], [1.44, [Float(∞), Float(∞)]], [1.45, [Float(∞), Float(∞)]], [1.46, [Float(∞), Float(∞)]], [1.47, [Float(∞), Float(∞)]], [1.48, [Float(∞), Float(∞)]], [1.49, [Float(∞), Float(∞)]], [1.50, [Float(∞), Float(∞)]], [1.51, [Float(∞), Float(∞)]], [1.52, [Float(∞), Float(∞)]], [1.53, [Float(∞), Float(∞)]], [1.54, [Float(∞), Float(∞)]], [1.55, [Float(∞), Float(∞)]], [1.56, [Float(∞), Float(∞)]], [1.57, [Float(∞), Float(∞)]], [1.58, [Float(∞), Float(∞)]], [1.59, [Float(∞), Float(∞)]], [1.60, [Float(∞), Float(∞)]], [1.61, [Float(∞), Float(∞)]], [1.62, [Float(∞), Float(∞)]], [1.63, [Float(∞), Float(∞)]], [1.64, [Float(∞), Float(∞)]], [1.65, [Float(∞), Float(∞)]], [1.66, [Float(∞), Float(∞)]], [1.67, [Float(∞), Float(∞)]], [1.68, [Float(∞), Float(∞)]], [1.69, [Float(∞), Float(∞)]], [1.70, [Float(∞), Float(∞)]], [1.71, [Float(∞), Float(∞)]], [1.72, [Float(∞), Float(∞)]], [1.73, [Float(∞), Float(∞)]], [1.74, [Float(∞), Float(∞)]], [1.75, [Float(∞), Float(∞)]], [1.76, [Float(∞), Float(∞)]], [1.77, [Float(∞), Float(∞)]], [1.78, [Float(∞), Float(∞)]], [1.79, [Float(∞), Float(∞)]], [1.80, [Float(∞), Float(∞)]], [1.81, [Float(∞), Float(∞)]], [1.82, [Float(∞), Float(∞)]], [1.83, [Float(∞), Float(∞)]], [1.84, [Float(∞), Float(∞)]], [1.85, [Float(∞), Float(∞)]], [1.86, [Float(∞), Float(∞)]], [1.87, [Float(∞), Float(∞)]], [1.88, [Float(∞), Float(∞)]], [1.89, [Float(∞), Float(∞)]], [1.90, [Float(∞), Float(∞)]], [1.91, [Float(∞), Float(∞)]], [1.92, [Float(∞), Float(∞)]], [1.93, [Float(∞), Float(∞)]], [1.94, [Float(∞), Float(∞)]], [1.95, [Float(∞), Float(∞)]], [1.96, [Float(∞), Float(∞)]], [1.97, [Float(∞), Float(∞)]], [1.98, [Float(∞), Float(∞)]], [1.99, [Float(∞), Float(∞)]], [2.00, [Float(∞), Float(∞)]], [2.01, [Float(∞), Float(∞)]]]]

>
>
>

>

> #@ {$x = 10, y = -6$}

>

>

> $Dis2(F, x, y, [10 + 0.1, -6 + 0.1], 0.01, 2)$

$\big[\,[0.01, [10.1, -5.9]], [0.02, [10.4172, -5.9350]], [0.03, [11.10454292, -5.996158713]],$ **(62)**

$\quad [0.04, [12.81270979, -6.075185340]], [0.05, [18.48867650, -5.924003896]], [0.06,$

$\quad [54.20093836, -1.379955809]], [0.07, [995.1203869, 199.5894542]], [0.08,$

$\quad [550140.2185, 133844.9542]], [0.09, [1.829678365 \times 10^{11}, 4.510887744 \times 10^{10}]], [0.10,$

$\quad [2.036718536 \times 10^{22}, 5.025277976 \times 10^{21}]], [0.11, [2.524688971 \times 10^{44}, 6.229557886$

$\quad \times 10^{43}]], [0.12, [3.879460778 \times 10^{88}, 9.572423624 \times 10^{87}]], [0.13, [9.160072446$

$\quad \times 10^{176}, 2.260213810 \times 10^{176}]], [0.14, [5.106860899 \times 10^{353}, 1.260098948 \times 10^{353}]],$

$\quad [0.15, [1.587319207 \times 10^{707}, 3.916651155 \times 10^{706}]], [0.16, [1.533503448 \times 10^{1414},$

$\quad 3.783862770 \times 10^{1413}]], [0.17, [1.431283709 \times 10^{2828}, 3.531639359 \times 10^{2827}]], [0.18,$

$\quad [1.246831225 \times 10^{5656}, 3.076509714 \times 10^{5655}]], [0.19, [9.461751862 \times 10^{11311},$

$\quad 2.334652109 \times 10^{11311}]], [0.20, [5.448780620 \times 10^{22623}, 1.344466369 \times 10^{22623}]], [0.21,$

$\quad [1.806986297 \times 10^{45247}, 4.458671538 \times 10^{45246}]], [0.22, [1.987311441 \times 10^{90494},$

$\quad 4.903617125 \times 10^{90493}]], [0.23, [2.403743260 \times 10^{180988}, 5.931147168 \times 10^{180987}]],$

$\quad [0.24, [3.516676126 \times 10^{361976}, 8.677267655 \times 10^{361975}]], [0.25, [7.526983434$

$\quad \times 10^{723952}, 1.857255190 \times 10^{723952}]], [0.26, [3.448245153 \times 10^{1447905}, 8.508416774$

$\quad \times 10^{1447904}]], [0.27, [7.236898522 \times 10^{2895810}, 1.785677817 \times 10^{2895810}]], [0.28,$

$\quad [3.187580636 \times 10^{5791621}, 7.865236760 \times 10^{5791620}]], [0.29, [6.184129476 \times 10^{11583242},$

$\quad 1.525910967 \times 10^{11583242}]], [0.30, [2.327626868 \times 10^{23166485}, 5.743332796$

$\quad \times 10^{23166484}]], [0.31, [3.297485827 \times 10^{46332970}, 8.136423733 \times 10^{46332969}]], [0.32,$

$\quad [6.617928782 \times 10^{92665940}, 1.632949333 \times 10^{92665940}]], [0.33, [2.665633222$

$\quad \times 10^{185331881}, 6.577350917 \times 10^{185331880}]], [0.34, [4.324710082 \times 10^{370663762},$

$\quad 1.067106142 \times 10^{370663762}]], [0.35, [1.138335321 \times 10^{741327525}, 2.808800103$

$\quad \times 10^{741327524}]], [0.36, [7.886723903 \times 10^{1482655049}, 1.946019815 \times 10^{1482655049}]], [0.37,$

$\quad [3.785728712 \times 10^{2965310099}, 9.341144917 \times 10^{2965310098}]], [0.38, [8.722785477$

$\quad \times 10^{5930620198}, 2.152314902 \times 10^{5930620198}]], [0.39, [4.630912741 \times 10^{11861240397},$

$\quad 1.142660510 \times 10^{11861240397}]], [0.40, [1.305237100 \times 10^{23722480795}, 3.220624039$

$\quad \times 10^{23722480794}]], [0.41, [1.036895605 \times 10^{47444961590}, 2.558501371 \times 10^{47444961589}]],$

$\quad [0.42, [6.543743707 \times 10^{94889923179}, 1.614644442 \times 10^{94889923179}]], [0.43, [2.606206220$

$\quad \times 10^{189779846359}, 6.430716995 \times 10^{189779846358}]], [0.44, [4.134031372 \times 10^{379559692718},$

$1.020056878 \times 10^{379559692718}$]], [0.45, [$1.040168626 \times 10^{759119385437}$, 2.566577430

$\times 10^{759119385436}$]], [0.46, [$6.585120320 \times 10^{1518238770873}$, 1.624853968

$\times 10^{1518238770873}$]], [0.47, [$2.639268919 \times 10^{3036477541747}$, 6.512297976

$\times 10^{3036477541746}$]], [0.48, [$4.239586502 \times 10^{6072955083494}$, 1.046102215

$\times 10^{6072955083494}$]], [0.49, [$1.093964467 \times 10^{12145910166989}$, 2.699316668

$\times 10^{12145910166988}$]], [0.50, [$7.283877712 \times 10^{24291820333977}$, 1.797269757

$\times 10^{24291820333977}$]], [0.51, [$3.229100083 \times 10^{48583640667955}$, 7.967684454

$\times 10^{48583640667954}$]], [0.52, [$6.346279945 \times 10^{97167281335910}$, 1.565920992

$\times 10^{97167281335910}$]], [0.53, [$2.451289841 \times 10^{194334562671821}$, 6.048466589

$\times 10^{194334562671820}$]], [0.54, [$3.657173336 \times 10^{388669125343642}$, 9.023939304

$\times 10^{388669125343641}$]], [0.55, [$8.140429201 \times 10^{777338250687284}$, 2.008620653

$\times 10^{777338250687284}$]], [0.56, [$4.033209866 \times 10^{1554676501374569}$, 9.951795464

$\times 10^{1554676501374568}$]], [0.57, [$9.900516588 \times 10^{3109353002749138}$, 2.442915676

$\times 10^{3109353002749138}$]], [0.58, [$5.965844450 \times 10^{6218706005498277}$, 1.472049948

$\times 10^{6218706005498277}$]], [0.59, [$2.166207551 \times 10^{12437412010996555}$, 5.345036631

$\times 10^{12437412010996554}$]], [0.60, [$2.855987780 \times 10^{24874824021993110}$, 7.047043710

$\times 10^{24874824021993109}$]], [0.61, [$4.964424427 \times 10^{49749648043986220}$, 1.224953279

$\times 10^{49749648043986220}$]], [0.62, [$1.500009542 \times 10^{99499296087972441}$, 3.701217802

$\times 10^{99499296087972440}$]], [0.63, [$1.369443936 \times 10^{198998592175944882}$, 3.379052024

$\times 10^{198998592175944881}$]], [0.64, [$1.141418031 \times 10^{397997184351889764}$, 2.816406574

$\times 10^{397997184351889763}$]], [0.65, [$7.929497595 \times 10^{795994368703779527}$, 1.956574064

$\times 10^{795994368703779527}$]], [0.66, [$3.826903909 \times 10^{1591988737407559055}$, 9.442743180

$\times 10^{1591988737407559054}$]], [0.67, [$8.913562807 \times 10^{3183977474815118110}$, 2.199388499

$\times 10^{3183977474815118110}$]], [0.68, [$4.835694679 \times 10^{6367954949630236221}$, 1.193189692

$\times 10^{6367954949630236221}$]], [0.69, [Float($\infty$), Float($\infty$)]], [0.70, [Float($\infty$), Float($\infty$)]],

[0.71, [Float(∞), Float(∞)]], [0.72, [Float(∞), Float(∞)]], [0.73, [Float(∞),

Float(∞)]], [0.74, [Float(∞), Float(∞)]], [0.75, [Float(∞), Float(∞)]], [0.76, [

Float(∞), Float(∞)]], [0.77, [Float(∞), Float(∞)]], [0.78, [Float(∞), Float(∞)]],

[0.79, [Float(∞), Float(∞)]], [0.80, [Float(∞), Float(∞)]], [0.81, [Float(∞),

Float(∞)]], [0.82, [Float(∞), Float(∞)]], [0.83, [Float(∞), Float(∞)]], [0.84, [

Float(∞), Float(∞)]], [0.85, [Float(∞), Float(∞)]], [0.86, [Float(∞), Float(∞)]],

[0.87, [Float(∞), Float(∞)]], [0.88, [Float(∞), Float(∞)]], [0.89, [Float(∞),

Float(∞)]], [0.90, [Float(∞), Float(∞)]], [0.91, [Float(∞), Float(∞)]], [0.92, [

Float(∞), Float(∞)]], [0.93, [Float(∞), Float(∞)]], [0.94, [Float(∞), Float(∞)]],

[0.95, [Float(∞), Float(∞)]], [0.96, [Float(∞), Float(∞)]], [0.97, [Float(∞), Float(∞)]], [0.98, [Float(∞), Float(∞)]], [0.99, [Float(∞), Float(∞)]], [1.00, [Float(∞), Float(∞)]], [1.01, [Float(∞), Float(∞)]], [1.02, [Float(∞), Float(∞)]], [1.03, [Float(∞), Float(∞)]], [1.04, [Float(∞), Float(∞)]], [1.05, [Float(∞), Float(∞)]], [1.06, [Float(∞), Float(∞)]], [1.07, [Float(∞), Float(∞)]], [1.08, [Float(∞), Float(∞)]], [1.09, [Float(∞), Float(∞)]], [1.10, [Float(∞), Float(∞)]], [1.11, [Float(∞), Float(∞)]], [1.12, [Float(∞), Float(∞)]], [1.13, [Float(∞), Float(∞)]], [1.14, [Float(∞), Float(∞)]], [1.15, [Float(∞), Float(∞)]], [1.16, [Float(∞), Float(∞)]], [1.17, [Float(∞), Float(∞)]], [1.18, [Float(∞), Float(∞)]], [1.19, [Float(∞), Float(∞)]], [1.20, [Float(∞), Float(∞)]], [1.21, [Float(∞), Float(∞)]], [1.22, [Float(∞), Float(∞)]], [1.23, [Float(∞), Float(∞)]], [1.24, [Float(∞), Float(∞)]], [1.25, [Float(∞), Float(∞)]], [1.26, [Float(∞), Float(∞)]], [1.27, [Float(∞), Float(∞)]], [1.28, [Float(∞), Float(∞)]], [1.29, [Float(∞), Float(∞)]], [1.30, [Float(∞), Float(∞)]], [1.31, [Float(∞), Float(∞)]], [1.32, [Float(∞), Float(∞)]], [1.33, [Float(∞), Float(∞)]], [1.34, [Float(∞), Float(∞)]], [1.35, [Float(∞), Float(∞)]], [1.36, [Float(∞), Float(∞)]], [1.37, [Float(∞), Float(∞)]], [1.38, [Float(∞), Float(∞)]], [1.39, [Float(∞), Float(∞)]], [1.40, [Float(∞), Float(∞)]], [1.41, [Float(∞), Float(∞)]], [1.42, [Float(∞), Float(∞)]], [1.43, [Float(∞), Float(∞)]], [1.44, [Float(∞), Float(∞)]], [1.45, [Float(∞), Float(∞)]], [1.46, [Float(∞), Float(∞)]], [1.47, [Float(∞), Float(∞)]], [1.48, [Float(∞), Float(∞)]], [1.49, [Float(∞), Float(∞)]], [1.50, [Float(∞), Float(∞)]], [1.51, [Float(∞), Float(∞)]], [1.52, [Float(∞), Float(∞)]], [1.53, [Float(∞), Float(∞)]], [1.54, [Float(∞), Float(∞)]], [1.55, [Float(∞), Float(∞)]], [1.56, [Float(∞), Float(∞)]], [1.57, [Float(∞), Float(∞)]], [1.58, [Float(∞), Float(∞)]], [1.59, [Float(∞), Float(∞)]], [1.60, [Float(∞), Float(∞)]], [1.61, [Float(∞), Float(∞)]], [1.62, [Float(∞), Float(∞)]], [1.63, [Float(∞), Float(∞)]], [1.64, [Float(∞), Float(∞)]], [1.65, [Float(∞), Float(∞)]], [1.66, [Float(∞), Float(∞)]], [1.67, [Float(∞), Float(∞)]], [1.68, [Float(∞), Float(∞)]], [1.69, [Float(∞), Float(∞)]], [1.70, [Float(∞), Float(∞)]], [1.71, [Float(∞), Float(∞)]], [1.72, [Float(∞), Float(∞)]], [1.73, [Float(∞), Float(∞)]], [1.74, [Float(∞), Float(∞)]], [1.75, [Float(∞), Float(∞)]], [1.76, [Float(∞), Float(∞)]], [1.77, [Float(∞), Float(∞)]], [1.78, [Float(∞), Float(∞)]], [1.79, [Float(∞), Float(∞)]], [1.80, [Float(∞), Float(∞)]], [1.81, [Float(∞), Float(∞)]], [1.82, [Float(∞), Float(∞)]], [1.83, [Float(∞), Float(∞)]], [1.84, [Float(∞), Float(∞)]], [1.85, [Float(∞), Float(∞)]], [1.86, [Float(∞), Float(∞)]], [1.87, [Float(∞), Float(∞)]], [1.88, [Float(∞), Float(∞)]], [1.89, [Float(∞), Float(∞)]], [1.90, [Float(∞), Float(∞)]], [1.91, [Float(∞), Float(∞)]], [1.92, [Float(∞), Float(∞)]], [1.93, [Float(∞), Float(∞)]], [1.94, [Float(∞), Float(∞)]], [1.95, [Float(∞), Float(∞)]], [1.96, [

$\text{Float}(\infty), \text{Float}(\infty)]], [1.97, [\text{Float}(\infty), \text{Float}(\infty)]], [1.98, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.99, [\text{Float}(\infty), \text{Float}(\infty)]], [2.00, [\text{Float}(\infty), \text{Float}(\infty)]], [2.01, [\text{Float}(\infty),$
$\text{Float}(\infty)]]]]$

>
>
>
>

> $\#@\left\{x = -\dfrac{27}{7}, y = \dfrac{32}{7}\right\}$

>
>

> $Dis2\left(F, x, y, \left[-\dfrac{27}{7} + 0.1, \dfrac{32}{7} + 0.1\right], 0.01, 2\right)$

$[[0.01, [-3.757142857, 4.671428571]], [0.02, [-3.524942857, 4.716428571]], [0.03,$ **(63)**
$[-2.920106173, 4.828554178]], [0.04, [-1.078763831, 5.180158326]], [0.05,$
$[6.993804745, 6.860952334]], [0.06, [87.80724330, 25.47202076]], [0.07,$
$[5137.119481, 1255.775085]], [0.08, [1.599252887 \times 10^{7}, 3.942319878 \times 10^{6}]], [0.09,$
$[1.555931813 \times 10^{14}, 3.838985426 \times 10^{13}]], [0.10, [1.473416223 \times 10^{28}, 3.635587502$
$\times 10^{27}]], [0.11, [1.321315117 \times 10^{56}, 3.260295295 \times 10^{55}]], [0.12, [1.062597964$
$\times 10^{112}, 2.621920958 \times 10^{111}]], [0.13, [6.872174372 \times 10^{223}, 1.695683487 \times 10^{223}]],$
$[0.14, [2.874382467 \times 10^{447}, 7.092431918 \times 10^{446}]], [0.15, [5.028579543 \times 10^{894},$
$1.240783315 \times 10^{894}]], [0.16, [1.539029210 \times 10^{1789}, 3.797497385 \times 10^{1788}]], [0.17,$
$[1.441617148 \times 10^{3578}, 3.557136739 \times 10^{3577}]], [0.18, [1.264899711 \times 10^{7156},$
$3.121093030 \times 10^{7155}]], [0.19, [9.737969294 \times 10^{14311}, 2.402807735 \times 10^{14311}]], [0.20,$
$[5.771557352 \times 10^{28623}, 1.424110329 \times 10^{28623}]], [0.21, [2.027413086 \times 10^{57247},$
$5.002566447 \times 10^{57246}]], [0.22, [2.501731545 \times 10^{114494}, 6.172929617 \times 10^{114493}]],$
$[0.23, [3.809233748 \times 10^{228988}, 9.399142719 \times 10^{228987}]], [0.24, [8.831438743$
$\times 10^{457976}, 2.179124690 \times 10^{457976}]], [0.25, [4.746998952 \times 10^{915953}, 1.171304351$
$\times 10^{915953}]], [0.26, [1.371495812 \times 10^{1831907}, 3.384114951 \times 10^{1831906}]], [0.27,$
$[1.144841030 \times 10^{3663814}, 2.824852698 \times 10^{3663813}]], [0.28, [7.977128457 \times 10^{7327627},$
$1.968326802 \times 10^{7327627}]], [0.29, [3.873016840 \times 10^{14655255}, 9.556525124 \times 10^{14655254}]],$
$[0.30, [9.129668001 \times 10^{29310510}, 2.252711652 \times 10^{29310510}]], [0.31, [5.073015434$
$\times 10^{58621021}, 1.251747706 \times 10^{58621021}]], [0.32, [1.566349170 \times 10^{117242043}, 3.864908371$
$\times 10^{117242042}]], [0.33, [1.493252935 \times 10^{234484086}, 3.684546123 \times 10^{234484085}]], [0.34,$
$[1.357134740 \times 10^{468968172}, 3.348679540 \times 10^{468968171}]], [0.35, [1.120991062$

$\times 10^{937936344}$, $2.766003787 \times 10^{937936343}$]], [0.36, [$7.648222499 \times 10^{1875872687}$, $1.887170479 \times 10^{1875872687}$]], [0.37, [$3.560223328 \times 10^{3751745375}$, $8.784718761 \times 10^{3751745374}$]], [0.38, [$7.714551761 \times 10^{7503490750}$, $1.903536978 \times 10^{7503490750}$]], [0.39, [$3.622243223 \times 10^{15006981501}$, $8.937750543 \times 10^{15006981500}$]], [0.40, [$7.985671319 \times 10^{30013963002}$, $1.970434722 \times 10^{30013963002}$]], [0.41, [$3.881316661 \times 10^{60027926005}$, $9.577004626 \times 10^{60027926004}$]], [0.42, [$9.168839429 \times 10^{120055852010}$, $2.262377056 \times 10^{120055852010}$]], [0.43, [$5.116641021 \times 10^{240111704021}$, $1.262512158 \times 10^{240111704021}$]], [0.44, [$1.593404762 \times 10^{480223408043}$, $3.931667035 \times 10^{480223408042}$]], [0.45, [$1.545284453 \times 10^{960446816086}$, $3.812931964 \times 10^{960446816085}$]], [0.46, [$1.453359603 \times 10^{1920893632172}$, $3.586110811 \times 10^{1920893632171}$]], [0.47, [$1.285589697 \times 10^{3841787264344}$, $3.172144802 \times 10^{3841787264343}$]], [0.48, [$1.005914296 \times 10^{7683574528688}$, $2.482056145 \times 10^{7683574528687}$]], [0.49, [$6.158545791 \times 10^{15367149057375}$, $1.519598288 \times 10^{15367149057375}$]], [0.50, [$2.308407964 \times 10^{30734298114751}$, $5.695910864 \times 10^{30734298114750}$]], [0.51, [$3.243256835 \times 10^{61468596229502}$, $8.002615710 \times 10^{61468596229501}$]], [0.52, [$6.402047589 \times 10^{122937192459004}$, $1.579681451 \times 10^{122937192459004}$]], [0.53, [$2.494560322 \times 10^{245874384918009}$, $6.155234893 \times 10^{245874384918008}$]], [0.54, [$3.787426683 \times 10^{491748769836018}$, $9.345334593 \times 10^{491748769836017}$]], [0.55, [$8.730611903 \times 10^{983497539672036}$, $2.154246042 \times 10^{983497539672036}$]], [0.56, [$4.639226542 \times 10^{1966995079344073}$, $1.144711909 \times 10^{1966995079344073}$]], [0.57, [$1.309927848 \times 10^{3933990158688147}$, $3.232198285 \times 10^{3933990158688146}$]], [0.58, [$1.044361767 \times 10^{7867980317376294}$, $2.576923848 \times 10^{7867980317376293}$]], [0.59, [$6.638319373 \times 10^{15735960634752587}$, $1.637980636 \times 10^{15735960634752587}$]], [0.60, [$2.682084766 \times 10^{31471921269505175}$, $6.617944493 \times 10^{31471921269505174}$]], [0.61, [$4.378256618 \times 10^{62943842539010350}$, $1.080318551 \times 10^{62943842539010350}$]], [0.62, [$1.166698501 \times 10^{125887685078020701}$, $2.878785195 \times 10^{125887685078020700}$]], [0.63, [$8.284637183 \times 10^{251775370156041401}$, $2.044203438 \times 10^{251775370156041401}$]], [0.64, [$4.177372482 \times 10^{503550740312082803}$, $1.030751136 \times 10^{503550740312082803}$]], [0.65, [$1.062093173 \times 10^{1007101480624165607}$, $2.620675435 \times 10^{1007101480624165606}$]], [0.66, [$6.865646658 \times 10^{2014202961248331213}$, $1.694072799 \times 10^{2014202961248331213}$]], [0.67, [$2.868924447 \times 10^{4028405922496662427}$, $7.078964461 \times 10^{4028405922496662426}$]], [0.68, [$5.009500644 \times 10^{8056811844993324854}$, $1.236075668 \times 10^{8056811844993324854}$]], [0.69, [Float(∞), Float(∞)]], [0.70, [Float(∞), Float(∞)]],

[0.71, [Float(∞), Float(∞)]], [0.72, [Float(∞), Float(∞)]], [0.73, [Float(∞), Float(∞)]], [0.74, [Float(∞), Float(∞)]], [0.75, [Float(∞), Float(∞)]], [0.76, [Float(∞), Float(∞)]], [0.77, [Float(∞), Float(∞)]], [0.78, [Float(∞), Float(∞)]], [0.79, [Float(∞), Float(∞)]], [0.80, [Float(∞), Float(∞)]], [0.81, [Float(∞), Float(∞)]], [0.82, [Float(∞), Float(∞)]], [0.83, [Float(∞), Float(∞)]], [0.84, [Float(∞), Float(∞)]], [0.85, [Float(∞), Float(∞)]], [0.86, [Float(∞), Float(∞)]], [0.87, [Float(∞), Float(∞)]], [0.88, [Float(∞), Float(∞)]], [0.89, [Float(∞), Float(∞)]], [0.90, [Float(∞), Float(∞)]], [0.91, [Float(∞), Float(∞)]], [0.92, [Float(∞), Float(∞)]], [0.93, [Float(∞), Float(∞)]], [0.94, [Float(∞), Float(∞)]], [0.95, [Float(∞), Float(∞)]], [0.96, [Float(∞), Float(∞)]], [0.97, [Float(∞), Float(∞)]], [0.98, [Float(∞), Float(∞)]], [0.99, [Float(∞), Float(∞)]], [1.00, [Float(∞), Float(∞)]], [1.01, [Float(∞), Float(∞)]], [1.02, [Float(∞), Float(∞)]], [1.03, [Float(∞), Float(∞)]], [1.04, [Float(∞), Float(∞)]], [1.05, [Float(∞), Float(∞)]], [1.06, [Float(∞), Float(∞)]], [1.07, [Float(∞), Float(∞)]], [1.08, [Float(∞), Float(∞)]], [1.09, [Float(∞), Float(∞)]], [1.10, [Float(∞), Float(∞)]], [1.11, [Float(∞), Float(∞)]], [1.12, [Float(∞), Float(∞)]], [1.13, [Float(∞), Float(∞)]], [1.14, [Float(∞), Float(∞)]], [1.15, [Float(∞), Float(∞)]], [1.16, [Float(∞), Float(∞)]], [1.17, [Float(∞), Float(∞)]], [1.18, [Float(∞), Float(∞)]], [1.19, [Float(∞), Float(∞)]], [1.20, [Float(∞), Float(∞)]], [1.21, [Float(∞), Float(∞)]], [1.22, [Float(∞), Float(∞)]], [1.23, [Float(∞), Float(∞)]], [1.24, [Float(∞), Float(∞)]], [1.25, [Float(∞), Float(∞)]], [1.26, [Float(∞), Float(∞)]], [1.27, [Float(∞), Float(∞)]], [1.28, [Float(∞), Float(∞)]], [1.29, [Float(∞), Float(∞)]], [1.30, [Float(∞), Float(∞)]], [1.31, [Float(∞), Float(∞)]], [1.32, [Float(∞), Float(∞)]], [1.33, [Float(∞), Float(∞)]], [1.34, [Float(∞), Float(∞)]], [1.35, [Float(∞), Float(∞)]], [1.36, [Float(∞), Float(∞)]], [1.37, [Float(∞), Float(∞)]], [1.38, [Float(∞), Float(∞)]], [1.39, [Float(∞), Float(∞)]], [1.40, [Float(∞), Float(∞)]], [1.41, [Float(∞), Float(∞)]], [1.42, [Float(∞), Float(∞)]], [1.43, [Float(∞), Float(∞)]], [1.44, [Float(∞), Float(∞)]], [1.45, [Float(∞), Float(∞)]], [1.46, [Float(∞), Float(∞)]], [1.47, [Float(∞), Float(∞)]], [1.48, [Float(∞), Float(∞)]], [1.49, [Float(∞), Float(∞)]], [1.50, [Float(∞), Float(∞)]], [1.51, [Float(∞), Float(∞)]], [1.52, [Float(∞), Float(∞)]], [1.53, [Float(∞), Float(∞)]], [1.54, [Float(∞), Float(∞)]], [1.55, [Float(∞), Float(∞)]], [1.56, [Float(∞), Float(∞)]], [1.57, [Float(∞), Float(∞)]], [1.58, [Float(∞), Float(∞)]], [1.59, [Float(∞), Float(∞)]], [1.60, [Float(∞), Float(∞)]], [1.61, [Float(∞), Float(∞)]], [1.62, [Float(∞), Float(∞)]], [1.63, [Float(∞), Float(∞)]], [1.64, [Float(∞), Float(∞)]], [1.65, [Float(∞), Float(∞)]], [1.66, [Float(∞), Float(∞)]], [1.67, [Float(∞), Float(∞)]], [1.68, [Float(∞), Float(∞)]], [1.69, [Float(∞), Float(∞)]], [1.70, [Float(∞), Float(∞)]], [1.71, [Float(∞), Float(∞)]], [1.72, [

$\text{Float}(\infty), \text{Float}(\infty)]], [1.73, [\text{Float}(\infty), \text{Float}(\infty)]], [1.74, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.75, [\text{Float}(\infty), \text{Float}(\infty)]], [1.76, [\text{Float}(\infty), \text{Float}(\infty)]], [1.77, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [1.78, [\text{Float}(\infty), \text{Float}(\infty)]], [1.79, [\text{Float}(\infty), \text{Float}(\infty)]], [1.80, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [1.81, [\text{Float}(\infty), \text{Float}(\infty)]], [1.82, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.83, [\text{Float}(\infty), \text{Float}(\infty)]], [1.84, [\text{Float}(\infty), \text{Float}(\infty)]], [1.85, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [1.86, [\text{Float}(\infty), \text{Float}(\infty)]], [1.87, [\text{Float}(\infty), \text{Float}(\infty)]], [1.88, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [1.89, [\text{Float}(\infty), \text{Float}(\infty)]], [1.90, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.91, [\text{Float}(\infty), \text{Float}(\infty)]], [1.92, [\text{Float}(\infty), \text{Float}(\infty)]], [1.93, [\text{Float}(\infty),$
$\text{Float}(\infty)]], [1.94, [\text{Float}(\infty), \text{Float}(\infty)]], [1.95, [\text{Float}(\infty), \text{Float}(\infty)]], [1.96, [$
$\text{Float}(\infty), \text{Float}(\infty)]], [1.97, [\text{Float}(\infty), \text{Float}(\infty)]], [1.98, [\text{Float}(\infty), \text{Float}(\infty)]],$
$[1.99, [\text{Float}(\infty), \text{Float}(\infty)]], [2.00, [\text{Float}(\infty), \text{Float}(\infty)]], [2.01, [\text{Float}(\infty),$
$\text{Float}(\infty)]]]]$

>
>
>
> $\#@ \ \{x = 42, y = -26\}$
>
> $Dis2(F, x, y, [42 + 0.1, -26 + 0.1], 0.01, 2)$

$[[0.01, [42.1, -25.9]], [0.02, [43.5092, -25.8550]], [0.03, [53.83272256,$ **(64)**
$\quad -25.34020857]], [0.04, [179.1385351, -10.13548778]], [0.05, [9751.843230,$
$\quad 2087.627912]], [0.06, [5.425584451 \times 10^{7}, 1.327628801 \times 10^{7}]], [0.07, [1.784487118$
$\quad \times 10^{15}, 4.400983830 \times 10^{14}]], [0.08, [1.937670889 \times 10^{30}, 4.780991024 \times 10^{29}]], [0.09,$
$\quad [2.285125895 \times 10^{60}, 5.638453443 \times 10^{59}]], [0.10, [3.178162618 \times 10^{120}, 7.841997351$
$\quad \times 10^{119}]], [0.11, [6.147639934 \times 10^{240}, 1.516907298 \times 10^{240}]], [0.12, [2.300239510$
$\quad \times 10^{481}, 5.675755508 \times 10^{480}]], [0.13, [3.220344489 \times 10^{962}, 7.946080346 \times 10^{961}]],$
$\quad [0.14, [6.311911159 \times 10^{1924}, 1.557440623 \times 10^{1924}]], [0.15, [2.424811422 \times 10^{3849},$
$\quad 5.983132077 \times 10^{3848}]], [0.16, [3.578591716 \times 10^{7698}, 8.830042073 \times 10^{7697}]], [0.17,$
$\quad [7.794361038 \times 10^{15396}, 1.923229620 \times 10^{15396}]], [0.18, [3.697577209 \times 10^{30793},$
$\quad 9.123634356 \times 10^{30792}]], [0.19, [8.321291127 \times 10^{61586}, 2.053247662 \times 10^{61586}]], [0.20,$
$\quad [4.214418376 \times 10^{123173}, 1.039892073 \times 10^{123173}]], [0.21, [1.081014472 \times 10^{246347},$
$\quad 2.667363036 \times 10^{246346}]], [0.22, [7.112450062 \times 10^{492693}, 1.754970622 \times 10^{492693}]],$
$\quad [0.23, [3.078893554 \times 10^{985387}, 7.597055428 \times 10^{985386}]], [0.24, [5.769598111$
$\quad \times 10^{1970774}, 1.423626894 \times 10^{1970774}]], [0.25, [2.026036849 \times 10^{3941549}, 4.999170632$
$\quad \times 10^{3941548}]], [0.26, [2.498336274 \times 10^{7883098}, 6.164551920 \times 10^{7883097}]], [0.27,$
$\quad [3.798901225 \times 10^{15766196}, 9.373647600 \times 10^{15766195}]], [0.28, [8.783593272 \times 10^{31532392},$

$2.167318999 \times 10^{31532392}]], [0.29, [4.695703309 \times 10^{63064785}, 1.158647341$
$\times 10^{63064785}]], [0.30, [1.342015438 \times 10^{126129571}, 3.311373222 \times 10^{126129570}]], [0.31,$
$[1.096153154 \times 10^{252259142}, 2.704717172 \times 10^{252259141}]], [0.32, [7.313052474$
$\times 10^{504518283}, 1.804468522 \times 10^{504518283}]], [0.33, [3.255019491 \times 10^{1009036567},$
$8.031639636 \times 10^{1009036566}]], [0.34, [6.448569743 \times 10^{2018073134}, 1.591160619$
$\times 10^{2018073134}]], [0.35, [2.530946799 \times 10^{4036146269}, 6.245017174 \times 10^{4036146268}]],$
$[0.36, [3.898721803 \times 10^{8072292538}, 9.619951164 \times 10^{8072292537}]], [0.37, [9.251256189$
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$[1.711848342 \times 10^{516626722456}, 4.223922169 \times 10^{516626722455}]], [0.43, [1.783556152$
$\times 10^{1033253444912}, 4.400858529 \times 10^{1033253444911}]], [0.44, [1.936108929 \times 10^{2066506889824},$
$4.777276835 \times 10^{2066506889823}]], [0.45, [2.281475396 \times 10^{4133013779648}, 5.629455761$
$\times 10^{4133013779647}]], [0.46, [3.168019115 \times 10^{8266027559296}, 7.816969439$
$\times 10^{8266027559295}]], [0.47, [6.108460936 \times 10^{16532055118592}, 1.507240035$
$\times 10^{16532055118592}]], [0.48, [2.271014022 \times 10^{33064110237185}, 5.603642705$
$\times 10^{33064110237184}]], [0.49, [3.139032739 \times 10^{66128220474370}, 7.745446636$
$\times 10^{66128220474369}]], [0.50, [5.997191336 \times 10^{132256440948740}, 1.479784675$
$\times 10^{132256440948740}]], [0.51, [2.189031564 \times 10^{264512881897481}, 5.401354037$
$\times 10^{264512881897480}]], [0.52, [2.916488457 \times 10^{529025763794962}, 7.196326883$
$\times 10^{529025763794961}]], [0.53, [5.176982988 \times 10^{1058051527589924}, 1.277401314$
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$\times 10^{2116103055179848}]], [0.55, [1.619480018 \times 10^{4232206110359698}, 3.996006762$
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$\times 10^{135430595531510335}]], [0.61, [6.523482421 \times 10^{270861191063020671}, 1.609645045$
$\times 10^{270861191063020671}]], [0.62, [2.590092098 \times 10^{541722382126041343}, 6.390956000$
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$\times 10^{8667558114016661490}]]$, $[0.67, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.68, [\text{Float}(\infty), \text{Float}(\infty)]]$,
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$\text{Float}(\infty)]]$, $[0.72, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.73, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.74, [$
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$\text{Float}(\infty)]]$, $[0.88, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.89, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[0.90, [$
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$[1.01, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.02, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.03, [\text{Float}(\infty),$
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$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.07, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.08, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.09, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.10, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.11, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.12, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.13, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.14, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.15, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.16, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.17, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.18, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.19, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.20, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.21, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.22, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.23, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.24, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.25, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.26, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.27, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.28, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.29, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.30, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.31, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.32, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.33, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.34, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.35, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.36, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.37, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.38, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.39, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.40, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.41, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.42, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.43, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.44, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.45, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.46, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.47, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.48, [\text{Float}(\infty), \text{Float}(\infty)]]$,
$[1.49, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.50, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.51, [\text{Float}(\infty),$
$\text{Float}(\infty)]]$, $[1.52, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.53, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.54, [$
$\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.55, [\text{Float}(\infty), \text{Float}(\infty)]]$, $[1.56, [\text{Float}(\infty), \text{Float}(\infty)]]$,

[1.57, [Float(∞), Float(∞)]], [1.58, [Float(∞), Float(∞)]], [1.59, [Float(∞),
Float(∞)]], [1.60, [Float(∞), Float(∞)]], [1.61, [Float(∞), Float(∞)]], [1.62, [
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Float(∞), Float(∞)]], [1.71, [Float(∞), Float(∞)]], [1.72, [Float(∞), Float(∞)]],
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Float(∞)]], [1.76, [Float(∞), Float(∞)]], [1.77, [Float(∞), Float(∞)]], [1.78, [
Float(∞), Float(∞)]], [1.79, [Float(∞), Float(∞)]], [1.80, [Float(∞), Float(∞)]],
[1.81, [Float(∞), Float(∞)]], [1.82, [Float(∞), Float(∞)]], [1.83, [Float(∞),
Float(∞)]], [1.84, [Float(∞), Float(∞)]], [1.85, [Float(∞), Float(∞)]], [1.86, [
Float(∞), Float(∞)]], [1.87, [Float(∞), Float(∞)]], [1.88, [Float(∞), Float(∞)]],
[1.89, [Float(∞), Float(∞)]], [1.90, [Float(∞), Float(∞)]], [1.91, [Float(∞),
Float(∞)]], [1.92, [Float(∞), Float(∞)]], [1.93, [Float(∞), Float(∞)]], [1.94, [
Float(∞), Float(∞)]], [1.95, [Float(∞), Float(∞)]], [1.96, [Float(∞), Float(∞)]],
[1.97, [Float(∞), Float(∞)]], [1.98, [Float(∞), Float(∞)]], [1.99, [Float(∞),
Float(∞)]], [2.00, [Float(∞), Float(∞)]], [2.01, [Float(∞), Float(∞)]]]

> *#3*
> $SIRS(s, i, \text{beta}, \text{gamma}, \text{nu}, N)$

$$[-\beta\, s\, i + \gamma\, (N - s - i),\ \beta\, s\, i - \nu\, i] \tag{65}$$

>

> $EquPts(SIRS(s, i, \text{beta}, \text{gamma}, \text{nu}, N), \{s, i\})$

$$\left\{ \{0, N\}, \left\{ \frac{\nu}{\beta}, \frac{\gamma\,(N\beta - \nu)}{\beta\,(\gamma + \nu)} \right\} \right\} \tag{66}$$

> #4

> $Chemostat := \mathbf{proc}(N, C, a1, a2) : \left[a1 \cdot \left(\dfrac{C}{1 + C} \right) \cdot N - N, \; - \left(\dfrac{C}{1 + C} \right) \cdot N - C + a2 \right]$:**end**:

> $EquPts(Chemostat(N, C, a1, a2), \{N, C\})$

$$\left\{ \{0, a2\}, \left\{ \dfrac{1}{a1 - 1}, \; \dfrac{a1 \, (a2 \, a1 - a2 - 1)}{a1 - 1} \right\} \right\} \qquad\qquad (67)$$

> #5

> #(i)

> $Orb3 := \mathbf{proc}(F, x, y, z, pt0, K1, K2) \;\; \mathbf{local}\, pt, L, i :$
$pt := pt0 :$

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

$L := [\;] :$
$\mathbf{for}\; i \;\mathbf{from}\; K1 \;\mathbf{to}\; K2 \;\mathbf{do}$
$L := [op(L), pt] :$
$pt := normal(subs(\{x = pt[1], y = pt[2], z = pt[3]\}, F)) :$

od:

```
    L :
    end:
```

```
>
>
> Dis3 := proc(F, x, y, z, pt, h, A) local L, i :

    L := Orb3([x + h*F[1], y + h*F[2], z + h·F[3]], x, y, z, pt, 0, trunc(A/h)) :

    L := [seq([i*h, [L[i][1], L[i][2], L[i][3]]], i = 1 ..nops(L))] :
    end:
```

```
>
>
> Dis3([x + y + z, x + y + z, x + y + z], x, y, z, [1, 2, 3], 1, 3)
```
$$[[1, [1, 2, 3]], [2, [7, 8, 9]], [3, [31, 32, 33]], [4, [127, 128, 129]]] \tag{68}$$

```
>
>
>
>
>
>
> #(ii)
>
> RandNice([x, y, z], 10)
```
$$[(1 - 6x - 7y - 7z)(3 - 3x - 5y - 3z), (8 - 10x - 3y - z)(1 - 3x - 5y - 5z), \tag{69}$$
$$(10 - 10x - 10y - 2z)(8 - 4x - 2y - 9z)]$$

```
> F := [(1 - 6x - 7y - 7z)(3 - 3x - 5y - 3z), (8 - 10x - 3y - z)(1 - 3x - 5y - 5z), (10 - 10x - 10y - 2z)(8 - 4x - 2y - 9z)]
```
$$F := [(1 - 6x - 7y - 7z)(3 - 3x - 5y - 3z), (8 - 10x - 3y - z)(1 - 3x - 5y \tag{70}$$
$$- 5z), (10 - 10x - 10y - 2z)(8 - 4x - 2y - 9z)]$$

```
>
>
> sys := {(1 - 6·x - 7·y - 7·z)·(3 - 3·x - 5·y - 3·z) = 0, (8 - 10·x - 3·y - z)·(1 - 3
        ·x - 5·y - 5·z) = 0, (10 - 10·x - 10·y - 2·z)·(8 - 4·x - 2·y - 9·z) = 0}
```
$$sys := \{(1 - 6x - 7y - 7z)(3 - 3x - 5y - 3z) = 0, (8 - 10x - 3y - z)(1 - 3x - 5y \tag{71}$$
$$- 5z) = 0, (10 - 10x - 10y - 2z)(8 - 4x - 2y - 9z) = 0\}$$

```
> solve(sys, {x, y, z})
```
$$\left\{x = 0, y = \frac{6}{5}, z = -1\right\}, \left\{x = -\frac{2}{9}, y = \frac{13}{9}, z = -\frac{10}{9}\right\}, \left\{x = -\frac{2}{9}, y = -\frac{53}{63}, z = \frac{74}{63}\right\}, \left\{x \tag{72}\right.$$

$$\left. = \frac{73}{14}, y = -\frac{27}{14}, z = -1\right\}, \left\{x = \frac{27}{37}, y = \frac{12}{37}, z = -\frac{10}{37}\right\}, \left\{x = \frac{76}{99}, y = \frac{83}{198}, z = -\frac{185}{198}\right\},$$

$$\left\{x = \frac{269}{331}, y = -\frac{78}{331}, z = \frac{192}{331}\right\}, \left\{x = \frac{479}{396}, y = -\frac{317}{198}, z = \frac{70}{99}\right\}$$

```
> #These are the equilibrium points.
```

>

>

>

>

> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$

$$J := \left[\begin{array}{cc} -21 + 36\,x + 51\,y + 39\,z & -26 + 51\,x + 70\,y + 56\,z \\ -34 + 60\,x + 59\,y + 53\,z & -43 + 59\,x + 30\,y + 20\,z \end{array} \right]$$ **(73)**

> *#I'm just gonna test two of the equilibrium points.*

>

> $\# \left\{ x = 0, y = \dfrac{6}{5}, z = -1 \right\}$

>

> $J := subs(x = 0, J)$

$$J := \left[\begin{array}{cc} -21 + 51\,y + 39\,z & -26 + 70\,y + 56\,z \\ -34 + 59\,y + 53\,z & -43 + 30\,y + 20\,z \end{array} \right]$$ **(74)**

> $J := subs\left(y = \dfrac{6}{5}, J \right)$

$$J := \left[\begin{array}{cc} \dfrac{201}{5} + 39\,z & 58 + 56\,z \\ \dfrac{184}{5} + 53\,z & -7 + 20\,z \end{array} \right]$$ **(75)**

> $J := subs(z = -1, J)$

$$J := \left[\begin{array}{cc} \dfrac{6}{5} & 2 \\ -\dfrac{81}{5} & -27 \end{array} \right]$$ **(76)**

> $evalf(Eigenvalues(J))$

$$\left[\begin{array}{c} 0. \\ -25.80000000 \end{array} \right]$$ **(77)**

> *#This point is not stable.*

>

> $Dis3\left(F, x, y, z, \left[0.1, \dfrac{6}{5} + 0.1, -0.9 \right], 0.01, 2 \right)$

$[[0.01, [0.1, 1.300000000, -0.9]], [0.02, [0.1264000000, 1.248000000, -1.188200000]],$ **(78)**

$[0.03, [0.1264966420, 1.261451884, -1.402806527]], [0.04, [0.1329158081,$

$1.319234956, -1.591769036]], [0.05, [0.1493838314, 1.403779996, -1.848067653]],$

$[0.06, [0.1840003630, 1.518674199, -2.237699294]], [0.07, [0.2612762874,$

$1.673997820, -2.859359078]], [0.08, [0.4486684040, 1.872084439, -3.925622500]],$

$[0.09, [0.9649123895, 2.052925519, -5.949856279]], [0.10, [2.694365534,$
$1.726097098, -10.38583121]], [0.11, [10.62296271, -3.248515941, -22.10512834]],$
$[0.12, [72.22459243, -66.90548732, -55.49912306]], [0.13, [1291.985795,$
$-1882.305414, 183.4566274]], [0.14, [207854.6734, -345945.1677, -168780.8361]],$
$[0.15, [3.799015461 \times 10^{10}, -1.700341682 \times 10^{10}, 2.370633929 \times 10^{10}]], [0.16,$
$[2.750603780 \times 10^{20}, 5.200288902 \times 10^{20}, 8.523967122 \times 10^{20}]], [0.17, [6.734722239$
$\times 10^{41}, 3.969024717 \times 10^{41}, 9.474033396 \times 10^{41}]], [0.18, [9.210068946 \times 10^{83},$
$7.756582449 \times 10^{83}, 1.513631041 \times 10^{84}]], [0.19, [2.409884428 \times 10^{168}, 1.854431332$
$\times 10^{168}, 3.770456891 \times 10^{168}]], [0.20, [1.497281530 \times 10^{337}, 1.181979126 \times 10^{337},$
$2.372828977 \times 10^{337}]], [0.21, [5.933635931 \times 10^{674}, 4.651695568 \times 10^{674}, 9.369559555$
$\times 10^{674}]], [0.22, [9.251270196 \times 10^{1349}, 7.266496177 \times 10^{1349}, 1.462266281 \times 10^{1350}]],$
$[0.23, [2.253348405 \times 10^{2700}, 1.768981101 \times 10^{2700}, 3.560702257 \times 10^{2700}]], [0.24,$
$[1.336115244 \times 10^{5401}, 1.049063445 \times 10^{5401}, 2.111463578 \times 10^{5401}]], [0.25,$
$[4.698298715 \times 10^{10802}, 3.688766272 \times 10^{10802}, 7.424571518 \times 10^{10802}]], [0.26,$
$[5.809195640 \times 10^{21605}, 4.561012695 \times 10^{21605}, 9.180138253 \times 10^{21605}]], [0.27,$
$[8.881201399 \times 10^{43211}, 6.972936107 \times 10^{43211}, 1.403473651 \times 10^{43212}]], [0.28,$
$[2.075782209 \times 10^{86424}, 1.629769227 \times 10^{86424}, 3.280307189 \times 10^{86424}]], [0.29,$
$[1.133971904 \times 10^{172849}, 8.903208067 \times 10^{172848}, 1.791987491 \times 10^{172849}]], [0.30,$
$[3.384100164 \times 10^{345698}, 2.656974980 \times 10^{345698}, 5.347809180 \times 10^{345698}]], [0.31,$
$[3.013873824 \times 10^{691397}, 2.366297337 \times 10^{691397}, 4.762749677 \times 10^{691397}]], [0.32,$
$[2.390500143 \times 10^{1382795}, 1.876864952 \times 10^{1382795}, 3.777647797 \times 10^{1382795}]], [0.33,$
$[1.503890414 \times 10^{2765591}, 1.180756761 \times 10^{2765591}, 2.376560537 \times 10^{2765591}]], [0.34,$
$[5.952111040 \times 10^{5531182}, 4.673209756 \times 10^{5531182}, 9.405972721 \times 10^{5531182}]], [0.35,$
$[9.323536852 \times 10^{11062365}, 7.320233625 \times 10^{11062365}, 1.473375291 \times 10^{11062366}]], [0.36,$
$[2.287705026 \times 10^{22124732}, 1.796156921 \times 10^{22124732}, 3.615203233 \times 10^{22124732}]], [0.37,$
$[1.377332182 \times 10^{44249465}, 1.081391483 \times 10^{44249465}, 2.176563718 \times 10^{44249465}]], [0.38,$
$[4.992476539 \times 10^{88498930}, 3.919767274 \times 10^{88498930}, 7.889486238 \times 10^{88498930}]], [0.39,$
$[6.559499566 \times 10^{176997861}, 5.150091652 \times 10^{176997861}, 1.036581368 \times 10^{176997862}]],$
$[0.40, [1.132348367 \times 10^{353995724}, 8.890461555 \times 10^{353995723}, 1.789421903$
$\times 10^{353995724}]], [0.41, [3.374417070 \times 10^{707991448}, 2.649372409 \times 10^{707991448},$
$5.332507190 \times 10^{707991448}]], [0.42, [2.996650962 \times 10^{1415982897}, 2.352775078$
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$$1.507624026 \times 10^{1449966487446}]], [0.53, [2.395296949 \times 10^{2899932974892}, 1.880631093$$

$$\times 10^{2899932974892}, 3.785228070 \times 10^{2899932974892}]], [0.54, [1.509931919 \times 10^{5799865949785},$$

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$$\times 10^{46398927598284}, 3.733035453 \times 10^{46398927598284}]], [0.58, [1.468579599$$

$$\times 10^{92797855196569}, 1.153033009 \times 10^{92797855196569}, 2.320759736 \times 10^{92797855196569}]],$$

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$$\times 10^{185595710393138}]], [0.60, [8.478243596 \times 10^{371191420786277}, 6.656564437$$

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$$\times 10^{11878125465160906}]], [0.66, [7.702141178 \times 10^{23756250930321813}, 6.047219392$$

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$$\times 10^{47512501860643628}, 1.225761122 \times 10^{47512501860643628}, 2.467142775$$

$$\times 10^{47512501860643628}]], [0.68, [6.414485497 \times 10^{95025003721287256}, 5.036236055$$

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Float(∞), Float(∞)]]]

>
>
>
>
>
> $\# \left\{ x = -\dfrac{2}{9}, y = \dfrac{13}{9}, z = -\dfrac{10}{9} \right\}$
>
>
>
> $J := Matrix([[diff(F[1], x), diff(F[1], y)], [diff(F[2], x), diff(F[2], y)]])$

$$J := \begin{bmatrix} -21 + 36\,x + 51\,y + 39\,z & -26 + 51\,x + 70\,y + 56\,z \\ -34 + 60\,x + 59\,y + 53\,z & -43 + 59\,x + 30\,y + 20\,z \end{bmatrix} \tag{79}$$

>
>
> $J := subs\left(x = -\dfrac{2}{9}, J \right)$

$$J := \begin{bmatrix} -29 + 51\,y + 39\,z & -\dfrac{112}{3} + 70\,y + 56\,z \\[2mm] -\dfrac{142}{3} + 59\,y + 53\,z & -\dfrac{505}{9} + 30\,y + 20\,z \end{bmatrix} \tag{80}$$

> $J := subs\left(y = \dfrac{13}{9}, J \right)$

$$J := \begin{bmatrix} \dfrac{134}{3} + 39\,z & \dfrac{574}{9} + 56\,z \\[2mm] \dfrac{341}{9} + 53\,z & -\dfrac{115}{9} + 20\,z \end{bmatrix} \tag{81}$$

> $J := subs\left(z = -\dfrac{10}{9}, J \right)$

$$J := \begin{bmatrix} \dfrac{4}{3} & \dfrac{14}{9} \\[2mm] -21 & -35 \end{bmatrix} \tag{82}$$

> $evalf(Eigenvalues(J))$

$$\begin{bmatrix} 0.41082832 \\ -34.07749498 \end{bmatrix} \tag{83}$$

> $\#This\ point\ is\ not\ stable.$
>
>
>

>

>

>

> $Dis3\left(F, x, y, z, \left[-\dfrac{2}{9} + 0.1, \dfrac{13}{9} + 0.1, -\dfrac{10}{9} + 0.1\right], 0.01, 2\right)$

$[[0.01, [-0.1222222222, 1.544444444, -1.011111111]], [0.02, [-0.09577777780,$ **(84)**

$1.471644444, -1.330111111]], [0.03, [-0.09624816853, 1.505688010,$

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$[0.08, [0.2839147898, 2.452358566, -4.998603425]], [0.09, [1.119770940,$

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$\times 10^{30}, -2.773007102 \times 10^{31}, -2.241432508 \times 10^{31}]], [0.17, [5.984031308 \times 10^{62},$

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$\times 10^{125}, 6.876210561 \times 10^{125}]], [0.19, [4.918680530 \times 10^{251}, 3.563963497 \times 10^{251},$

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$\left[3.393191867 \times 10^{132171363}, 2.664113158 \times 10^{132171363}, 5.362176533 \times 10^{132171363}\right]\right],$
$\left[0.39, \left[3.030089645 \times 10^{264342727}, 2.379028952 \times 10^{264342727}, 4.788375144\right.\right.$
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$\left.3.818407616 \times 10^{528685455}\right]\right], \left[0.41, \left[1.536518653 \times 10^{1057370911}, 1.206374329\right.\right.$
$\left.\times 10^{1057370911}, 2.428122131 \times 10^{1057370911}\right]\right], \left[0.42, \left[6.213185446 \times 10^{2114741822},\right.\right.$
$\left.4.878188371 \times 10^{2114741822}, 9.818542104 \times 10^{2114741822}\right]\right], \left[0.43, \left[1.015938165\right.\right.$
$\left.\times 10^{4229483646}, 7.976484496 \times 10^{4229483645}, 1.605461761 \times 10^{4229483646}\right]\right], \left[0.44,\right.$
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$\left[0.45, \left[1.941712962 \times 10^{16917934585}, 1.524506499 \times 10^{16917934585}, 3.068440599\right.\right.$
$\left.\times 10^{16917934585}\right]\right], \left[0.46, \left[9.922216577 \times 10^{33835869170}, 7.790277939 \times 10^{33835869170},\right.\right.$
$\left.1.567983155 \times 10^{33835869171}\right]\right], \left[0.47, \left[2.590932193 \times 10^{67671738342}, 2.034231138\right.\right.$
$\left.\times 10^{67671738342}, 4.094385570 \times 10^{67671738342}\right]\right], \left[0.48, \left[1.766650895 \times 10^{135343476685},\right.\right.$
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$\left.\times 10^{138591720126123}\right]\right], \left[0.59, \left[2.472931693 \times 10^{277183440252246}, 1.941584833\right.\right.$
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