```
figdisp('Grupo 1')
Grupo 1
disp('NRC: 7543')
NRC: 7543
clock
ans =
     1.0e+03 *
       2.0220
                        0.0020 0.0100 0.0220 0.0220 0.0441
date
ans =
       '10-Feb-2022'
clc
disp('Prigrama de diferenciacion numerica')
Prigrama de diferenciacion numerica
help fdiff
   <strong>fdiff</strong> deriva funciones de manera numerica
    <strong>Llamada a la funcion</strong>
    [Ea, Er, Rt, F] = <strong>fdiff</strong>(f, o, t, x, h)
    <strong>Parametros de entrada</strong>
    <strong>f:</strong> Funcion deribable y continua
    <strong>o:</strong> Orden de la derivada 0< o <4
    <strong>t:</strong> Tipo de diferenciacion :
               <strong>0</strong> - Diferenciacion hacia atras
               <strong>1</strong> - Diferenciacion hacia adelante
               <strong>2</strong> - Diferenciacion hacia centrada
               <strong>3</strong> - Todos los metodos
    <strong>x:</strong> Punto a evaluar que debe de estar dentro del
dominio
    <strong>h:</strong> Paso de la derivada
syms x
f = ((135*log(abs(2*sqrt(x^2-3*x+2)+2*x-3)))+((sqrt(x^2-3*x+2)+2*x-3)))
3*x+2))*(16*x^2+52*x+202)))/16
f =
(135*log(abs(2*x + 2*(x^2 - 3*x + 2)^(1/2) - 3)))/16 + ((x^2 - 3*x + 2)^(1/2) - 3))/(x^2 - 3*x + 2)^2)/(x^2 - 3*x + 2)^2
2)^{(1/2)} (16*x^2 + 52*x + 202))/16
disp('Primera derivada')
Primera derivada
[Ea, Er, Rt, F] = fdiff(f, 1, 3, 0.5, 0.1)
<strong>Diferenciacion hacia adelante
</strong> <strong>i</strong>
                                                                            <strong>hi</strong>
<strong>f(hi)</strong>
                                                        <strong>Ea</strong>
<strong>Er</strong>
                                                       <strong>Rt</strong>
<strong>Derivada</strong>
       <strong> </strong>
                                                 <strong>____</strong>
<strong>____</strong> <strong>____</strong>
```

_ _	<th>trong> ng></th> <th></th> <th></th> <th></th> <th></th>	trong> ng>				
1	0.1	0.6	0.026652	-0.79643	21.803	
-3.3464 2	0.05	0.7	0.0051728	-0.15558	15.129	
-3.3249 3	0.025	0.8		-0.034312	10.934	
-3.3209 4		0.9		-0.0080498	8.1528	
-3.32						
5 -3.3198	0.00625	1		-0.001949	6.2314	
6 -3.3198	0.003125	1.1		-0.00047946	4.8605	
7 -3.3198	0.0015625	1.2	3.9472e-06	-0.0001189	3.8564	
8 -3.3198	0.00078125	1.3	9.8282e-07	-2.9605e-05	3.1045	
9 -3.3198	0.00039063	1.4	2.4521e-07	-7.3863e-06	2.5309	
10 -3.3198	0.00019531	1.5	6.124e-08	-1.8447e-06	2.0862	
11 -3.3198	9.7656e-05	1.6	1.5302e-08	-4.6095e-07	1.7367	
12	4.8828e-05	1.7	3.8246e-09	-1.1521e-07	1.4584	
-3.3198 13	-0.8	5.3198	2 0246- 00	1 1501- 07	2 2100	
) D 	iferenciacion i	hacia at 	ras <stroi< th=""><th>ng>hi</th><th>-3.3196</th><th></th></stroi<>	ng>hi	-3.3196	
(strong>D (strong> (strong>f (strong>E (strong>D (stro	iferenciacion	hacia at 	ras <strong strong>Eastrong>Rt<th>ng>hi ong> ong> </th><th>-3.3190</th><th></th></strong 	ng>hi ong> ong> 	-3.3190	
<pre> D f E D D _</pre>	iferenciacion	hacia at 	ras <strong strong="">EaRt ng><!--</th--><th>ng>hi</th> ong> ong> /strong>	ng>hi	-3.3190	
<pre> D f E D D <stro <strong="">_ _ _ _ _ <_ </stro></pre>	iferenciacion	hacia at ng> <stro< td=""> trong></stro<>	ras <strong strong>Eastrong>Rt<td>ng>hi ong> ong> /strong></td><td>-3.3190</td><td></td></strong 	ng>hi ong> ong> /strong>	-3.3190	
<pre>(strong>D (/strong>C (strong>E (strong>D</pre>	iferenciacion	hacia at ng> <stro< td=""> trong></stro<>	ras <pre></pre>	ng>hi ong> ong> /strong>		
<pre> D E D D _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ </pre>	iferenciacion	hacia at (stroug) (stroug	ras	ng>hi ong> ong> /strong> _		
<pre> D E E _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ </pre>	iferenciacion	hacia at > <str <strong=""> ng> 0.6 0.7</str>	ras	ng>hi ong> ong> /strong> _ _ _	21.803	
<pre> D f E D </pre> <pre> 3.3289 2 3.3228 3 3.3206 4</pre>	iferenciacion	hacia at > <str <stro="" trong=""> ng> 0.6 0.7 0.8</str>	ras	ng>hi ong> ong> /strong> _ _ _ _ -0.27572 -0.092405	21.803 15.129 10.934	
(strong>D (/strong> (strong>E (strong>D (strong>D (strong>_ (strong>_ (strong>_ 3.3289 2 3.3228 3 3.3206 4 -3.32	iferenciacion	hacia at > <str <stro="" trong=""> ng> 0.6 0.7 0.8</str>	ras	ng>hi ong> ong> /strong> _ _ -0.27572 -0.092405 -0.026474	21.803 15.129 10.934	
strong>D E	iferenciacion	hacia at <pre> color colo</pre>	ras	ng>hi ong> ong> _ _ _0.27572 _0.092405 _0.026474 _0.0070717 _0.0018268	21.803 15.129 10.934 8.1528	
strong>D E	iferenciacion	hacia at <pre></pre>	ras	ng>hi ong> ong> /strong> /strong> _ -0.27572 -0.092405 -0.026474 -0.0070717 -0.0018268 -0.00046418	21.803 15.129 10.934 8.1528 6.2314	
Strong>D (/strong> (/strong>f (strong>E (strong>) (strong>) (strong>) (strong>) (strong>) 3.3289 2 3.3288 3 3.3206 4 -3.32 5 3.3198 6 3.3198 7	iferenciacion	hacia at <pre></pre>	ras	ng>hi ong> ong> /strong> /strong> -0.27572 -0.092405 -0.026474 -0.0070717 -0.0018268 -0.00046418 -0.00011699	21.803 15.129 10.934 8.1528 6.2314 4.8605 3.8564	
<pre>0 D f E D _ _ _ _ _ <3.3289 23.3228 33.3206 4-3.32 53.3198 63.3198 73.3198</pre>	iferenciacion	hacia at	ras	ng>hi ong> ong> ong> /strong> _0.27572 0.092405 0.026474 0.0070717 0.0018268 0.00046418 0.00011699 2.9366e-05	21.803 15.129 10.934 8.1528 6.2314 4.8605 3.8564 3.1045	

```
0.00019531
                  1.5 6.1116e-08 -1.841e-06
  10
                                               2.0862
3.3198
                  1.6
      9.7656e-05
                        1.5287e-08
                                   -4.6048e-07
                                               1.7367
  11
3.3198
      4.8828e-05
                  1.7
                        3.8227e-09
                                   -1.1515e-07
                                               1.4584
  12
3.3198
  13 2.4414e-05 1.8 3.8227e-09 -1.1515e-07 1.4584
3.3198
<strong>Diferenciacion centrada
</strong> <strong>i</strong> <strong>hi</strong>
<strong>Derivada</strong>
<strong>_</strong> <strong>___</strong>
<strong>___</strong>
<strong>____</strong> <strong>___</strong>
<strong> </strong>
         0.1 0.6 0.00054043
                                  -0.016276
                                            21.803
  1
3.3203
               0.7
  2
        0.05
                      3.2135e-05
                                -0.00096797
                                            15.129
3.3198
        0.025
               0.8
                      1.9846e-06
                                 -5.9782e-05
                                            10.934
  3
3.3198
       0.0125 0.9
                      1.2367e-07
                                -3.7254e-06
                                           8.1528
 4
3.3198
      0.00625 1
                      7.7239e-09 -2.3267e-07 6.2314 -
 5
3.3198
     0.003125 1.1 7.7239e-09 -2.3267e-07 6.2314 -
  6
```

Elapsed time is 4.541800 seconds.

Ea =

3.3198

7.7239e-09

Er =

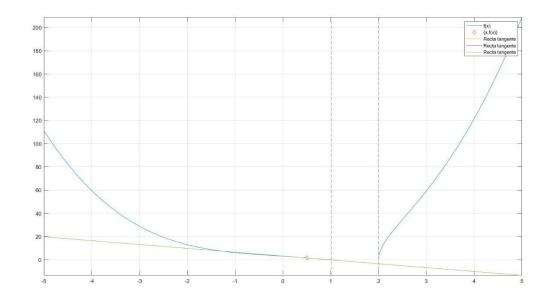
-2.3267e-07

Rt =

6.2314

F =

-3.3198



```
disp('Segunda Derivada')
Segunda Derivada
[Ea, Er, Rt, F] = fdiff(f, 2, 3, 0.5, 0.1)
<strong>Diferenciacion hacia adelante
</strong>[ Warning: Unable to solve symbolically. Returning a numeric
solution using
<a href="matlab:web(fullfile(docroot,
'symbolic/vpasolve.html'))">vpasolve</a>.]
[ > In < a
href="matlab:matlab.internal.language.introspective.errorDocCallback('sym
/solve', 'C:\Program
Files\Polyspace\R2020a\toolbox\symbolic\symbolic\@sym\solve.m', 304)"
style="font-weight:bold">sym/solve</a> (<a href="matlab:</pre>
opentoline('C:\Program
Files\Polyspace\R2020a\toolbox\symbolic\symbolic\@sym\solve.m',304,0)">li
ne 304 < /a >)
  In <a
href="matlab:matlab.internal.language.introspective.errorDocCallback('fdi
ff/pCriticos', 'C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m', 320)" style="font-
weight:bold">fdiff/pCriticos</a> (<a href="matlab:</pre>
opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m',320,0)">line 320</a>)
  In <a
href="matlab:matlab.internal.language.introspective.errorDocCallback('fdi
ff/diff adelante', 'C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m', 183)" style="font-
weight:bold">fdiff/diff adelante</a> (<a href="matlab:</pre>
opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m',183,0)">line 183</a>)
  In <a
href="matlab:matlab.internal.language.introspective.errorDocCallback('fdi
ff', 'C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m', 51)" style="font-
weight:bold">fdiff</a> (<a href="matlab:</pre>
```

```
opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m',51,0)">line 51</a>)]
   <strong>i</strong>
                           <strong>hi</strong>
<strong>f(hi)</strong>
                            <strong>Ea</strong>
                            <strong>Rt</strong>
<strong>Er</strong>
<strong>Derivada</strong>
                                  ____</strong>
   <strong>__</strong>
                        <strong>_
                                      ___</strong>
<strong>____</strong>
                         <strong>
<strong>__
           ___</strong>
                </strong>
                             <strong>
                                        </strong>
<strong>
                                  0.56773
               0.1
                         0.6
                                                -45.737
                                                            21.803
-1.2413
                    0.7
              0.05
                                 0.10018
                                                -12.948
                                                            15.129
    2
-0.77376
              0.025
                       0.8
                                0.021689
                                               -3.1195
                                                            10.934
    3
-0.69526
             0.0125
                       0.9
                                0.0050724
                                               -0.74743
                                                            8.1528
    4
-0.67865
                         1
           0.00625
                               0.0012279
                                               -0.18197
                                                            6.2314
    5
-0.6748
           0.003125
                         1.1
                               0.00030216
                                              -0.044839
                                                            4.8605
    6
-0.67388
                        1.2
    7
          0.0015625
                               7.495e-05
                                             -0.011126
                                                            3.8564
-0.67365
                      1.3
    8
         0.00078125
                              1.8664e-05
                                            -0.0027709
                                                            3.1045
-0.67359
    9
         0.00039063
                      1.4
                              4.657e-06
                                            -0.00069138
                                                            2.5309
-0.67358
         0.00019531
                    1.5 1.1631e-06
                                            -0.00017268
   10
                                                            2.0862
-0.67358
         9.7656e-05
                      1.6
                               2.9064e-07
                                            -4.3148e-05
                                                            1.7367
   11
-0.67358
         4.8828e-05
                        1.7
                              7.2641e-08
                                            -1.0784e-05
                                                            1.4584
   12
-0.67358
                        1.8
                              1.8158e-08
                                            -2.6958e-06
   13
         2.4414e-05
                                                            1.2344
-0.67358
   14
         1.2207e-05
                        1.9
                              4.5393e-09
                                             -6.739e-07
                                                            1.0523
-0.67358
   15
                -1
                      6.0711
                              4.5393e-09
                                            -6.739e-07
                                                         -0.67358
<strong>Diferenciacion hacia atras
</strong>[ Warning: Unable to solve symbolically. Returning a numeric
solution using
<a href="matlab:web(fullfile(docroot,
'symbolic/vpasolve.html'))">vpasolve</a>.]
[ > In <a
href="matlab:matlab.internal.language.introspective.errorDocCallback('sym
/solve', 'C:\Program
Files\Polyspace\R2020a\toolbox\symbolic\gym\solve.m', 304)"
style="font-weight:bold">sym/solve</a> (<a href="matlab:</pre>
opentoline('C:\Program
Files\Polyspace\R2020a\toolbox\symbolic\symbolic\@sym\solve.m',304,0)">li
ne 304 < /a >)
 In <a
```

href="matlab:matlab.internal.language.introspective.errorDocCallback('fdi

ff/pCriticos', 'C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.

```
Numericos\Grupal\Diferenciacion Numerica\fdiff.m', 320)" style="font-
weight:bold">fdiff/pCriticos</a> (<a href="matlab:</pre>
opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m',320,0)">line 320</a>)
  In <a
href="matlab:matlab.internal.language.introspective.errorDocCallback('fdi
ff/diff atras', 'C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m', 103)" style="font-
weight:bold">fdiff/diff atras</a> (<a href="matlab:</pre>
opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m',103,0)">line 103</a>)
  In <a
href="matlab:matlab.internal.language.introspective.errorDocCallback('fdi
ff', 'C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m', 53)" style="font-
weight:bold">fdiff</a> (<a href="matlab:</pre>
opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m',53,0)">line 53</a>)]
    <strong>i</strong>
                              <strong>hi</strong>
<strong>f(hi)</strong>
                              <strong>Ea</strong>
<strong>Er</strong>
                             <strong>Rt</strong>
<strong>Derivada</strong>
                                    ____</strong>
    <strong>__</strong>
                          <strong>
<strong>____</strong>
                         <strong>____</strong>
                                <strong>___</strong>
<strong>____</strong>
<strong> </strong>
                                                              21.803
                0.1
                         0.6
                                   0.19795
                                                   -22.713
0.87153
               0.05
                         0.7
                                   0.06048
                                                   -8.2391
                                                              15.129
     2
0.73406
               0.025
                         0.8
                                   0.016892
                                                              10.934
     3
                                                  -2.4464
0.69047
                         0.9
                                  0.0044778
                                                  -0.66039
                                                              8.1528
     4
              0.0125
0.67805
                                                  -0.17099
     5
            0.00625
                          1
                                  0.0011538
                                                              6.2314
0.67473
     6
            0.003125
                         1.1
                                 0.00029289
                                                 -0.043464
                                                              4.8605
0.67387
           0.0015625
                         1.2
                                 7.3791e-05
                                                -0.010954
    7
                                                              3.8564
0.67365
          0.00078125
                         1.3
                                 1.852e-05
                                                -0.0027494
                                                              3.1045
    8
0.67359
                                               -0.00068869
     9
         0.00039063
                         1.4
                                 4.6389e-06
                                                              2.5309
0.67358
         0.00019531
                         1.5
                                 1.1608e-06
                                               -0.00017234
                                                              2.0862
    10
0.67358
                                               -4.3106e-05
         9.7656e-05
                                 2.9035e-07
                         1.6
                                                              1.7367
    11
0.67358
         4.8828e-05
                         1.7
                                 7.2606e-08
                                               -1.0779e-05
                                                              1.4584
    12
0.67358
                         1.8
                                 1.8154e-08
   13
          2.4414e-05
                                               -2.6951e-06
                                                              1.2344
0.67358
                         1.9
                                 4.5387e-09
                                               -6.7382e-07
    14
          1.2207e-05
                                                              1.0523
0.67358
```

Diferenciacion centrada

```
</strong>[ Warning: Unable to solve symbolically. Returning a numeric
solution using
<a href="matlab:web(fullfile(docroot,
'symbolic/vpasolve.html'))">vpasolve</a>.]
[ > In < a
href="matlab:matlab.internal.language.introspective.errorDocCallback('sym
/solve', 'C:\Program
Files\Polyspace\R2020a\toolbox\symbolic\symbolic\@sym\solve.m', 304)"
style="font-weight:bold">sym/solve</a> (<a href="matlab:</pre>
opentoline('C:\Program
Files\Polyspace\R2020a\toolbox\symbolic\gym\solve.m',304,0)">li
ne 304 < /a >)
  In <a
href="matlab:matlab.internal.language.introspective.errorDocCallback('fdi
ff/pCriticos', 'C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m', 320)" style="font-
weight:bold">fdiff/pCriticos</a> (<a href="matlab:</pre>
opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m',320,0)">line 320</a>)
 In <a
href="matlab:matlab.internal.language.introspective.errorDocCallback('fdi
ff/diff centrada', 'C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m', 267)" style="font-
weight:bold">fdiff/diff centrada</a> (<a href="matlab:</pre>
opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m',267,0)">line 267</a>)
 In <a
href="matlab:matlab.internal.language.introspective.errorDocCallback('fdi
ff', 'C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m', 55)" style="font-
weight:bold">fdiff</a> (<a href="matlab:</pre>
opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m',55,0)">line 55</a>)]
   <strong>i</strong>
                          <strong>hi</strong>
<strong>f(hi)</strong>
                           <strong>Ea</strong>
<strong>Er</strong>
                            <strong>Rt</strong>
<strong>Derivada</strong>
   <strong>_</strong> <strong>____</strong>
<strong> ____</strong> ____</strong>
<strong>_____
              </strong>
                            <strong>____</strong>
<strong>____</strong>
            0.1
                     0.6
                             0.0011592
                                              -0.1718
                                                         21.803
0.67473
                     0.7
                             6.8137e-05
   2
            0.05
                                            -0.010115
                                                         15.129
0.67364
                             4.1966e-06 -0.00062304
          0.025
                     0.8
                                                         10.934
   3
0.67358
   4
         0.0125
                     0.9
                             2.6134e-07
                                          -3.8799e-05
                                                         8.1528
0.67358
   5
         0.00625
                      1
                             1.6319e-08
                                          -2.4228e-06
                                                         6.2314
0.67358
        0.003125
                     1.1
                            1.0197e-09
                                         -1.5139e-07
   6
                                                        4.8605
0.67358
```

Elapsed time is 6.036066 seconds.

```
1.0197e-09
```

Er =

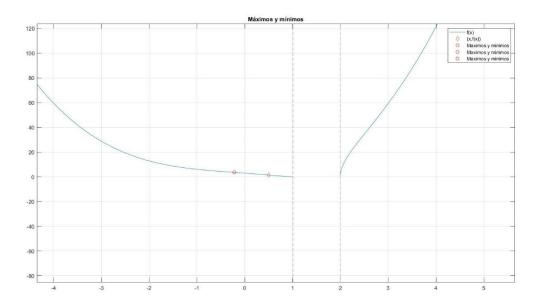
-1.5139e-07

Rt =

4.8605

F =

-0.6736



```
disp('Tercera Derivada')
Tercera Derivada
[Ea, Er, Rt, F] = fdiff(f, 3, 3, 0.5, 0.1)
<strong>Diferenciacion hacia adelante
</strong>[ Warning: Unable to solve symbolically. Returning a numeric
solution using
<a href="matlab:web(fullfile(docroot,
'symbolic/vpasolve.html'))">vpasolve</a>.]
[ > In <a
href="matlab:matlab.internal.language.introspective.errorDocCallback('sym
/solve', 'C:\Program
Files\Polyspace\R2020a\toolbox\symbolic\symbolic\@sym\solve.m', 304)"
style="font-weight:bold">sym/solve</a> (<a href="matlab:</pre>
opentoline('C:\Program
Files\Polyspace\R2020a\toolbox\symbolic\gym\solve.m',304,0)">li
ne 304 < /a >)
  In <a
href="matlab:matlab.internal.language.introspective.errorDocCallback('fdi
ff/pInflexion', 'C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
```

```
weight:bold">fdiff/pInflexion</a> (<a href="matlab:</pre>
opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
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                             <strong>hi</strong>
    <strong>i</strong>
                            <strong>Ea</strong>
<strong>f(hi)</strong>
<strong>Er</strong>
                             <strong>Rt</strong>
<strong>Derivada</strong>
   <strong>___</strong>
                                            </strong>
                         <strong>
<strong>____</strong>
                            <strong>____</strong>
<strong> </strong>
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0.51736 20	36522 1.9073e-07	2.5	-4.2493e+05	-99.999
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0.16927	-3.921e+13 1.8626e-10	3.5	4.5626e+14	-100
0.15378	-4.5626e+14			
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32 0.1278	4.6566e-11 2.9201e+16	3.7	-2.9201e+16	-100
33	2.3283e-11 -1.6061e+17	3.8	1.6061e+17	-100
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37 0.083312	1.4552e-12 -6.5784e+20	4.2	6.5784e+20	-100
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0.027129 54	0 1.1102e-17	5.9	4.8113	Inf
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367e-41	13.8	4.8113	Inf
0 335e-42		4.8113	Inf
0 918e-42		4.8113	Inf
_		4.8113	Inf
0			Inf
0			
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699e-43		4.8113	Inf
349e-43	14.5	4.8113	Inf
746e-44	14.6	4.8113	Inf
373e-44		4.8113	Inf
937e-44	0 14.8	4.8113	Inf
	0	4 0112	Inf
	0		
		4.8113	Inf
121e-45	15.1	4.8113	Inf
l21e-45	15.2	4.8113	Inf
)52e-46	-	4.8113	Inf
_		4 0112	T £
	0		Inf
		4.8113	Inf
065e-47		4.8113	Inf
)32e-47	15.7	4.8113	Inf
0 516e-47		4.8113	Inf
	0	4 8113	Inf
	0		
	0	4.8113	Inf
395e-48 ∩		4.8113	Inf
948e-48	16.2	4.8113	Inf
738e-49	-	4.8113	Inf
	0 16.4	4.8113	Inf
	0		
	0	4.8113	Inf
	367e-41 0335e-42 0918e-42 0959e-42 0479e-42 0397e-43 3699e-43 349e-43 746e-44 373e-44 373e-44 383e-45 342e-45 421e-45 026e-46 013e-46 013e-46 013e-46 013e-46 013e-47 032e-47 032e-47 032e-47 0316e-47	0 335e-42 0 918e-42 14.1 0 959e-42 14.1 0 179e-42 0 14.3 0 397e-43 14.3 0 349e-43 14.5 0 746e-44 14.6 0 373e-44 14.8 0 373e-44 14.8 0 342e-45 15.1 0 121e-45 0 15.2 0 026e-46 15.3 026e-46 15.3 013e-46 0 013e-46 0 013e-46 0 015.4 0013e-46 0 015.5 0013e-46 0 015.6 015.7 0165e-47 0 015.8 01791e-48 0 016.1 016.1 01791e-48 0 016.1 01791e-48 0 016.1	3667e-41 13.8 4.8113 0 13.9 4.8113 0 14.1 4.8113 0 14.1 4.8113 0 14.1 4.8113 0 14.2 4.8113 0 14.3 4.8113 0 14.4 4.8113 0 14.4 4.8113 0 14.5 4.8113 0 14.6 4.8113 0 14.7 4.8113 0 14.8 4.8113 0 14.8 4.8113 0 14.8 4.8113 0 14.8 4.8113 0 15.1 4.8113 0 15.1 4.8113 0 15.2 4.8113 0 15.2 4.8113 0 15.2 4.8113 0 15.4 4.8113 0 15.5 4.8113 0 15.5 4.8113 0 15.7 4.8113 0 15.9 4.8113

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166 0.00049464	2.1382e-51	0	17.1	4.8113	Inf
167 0.00048373	1.0691e-51	0	17.2	4.8113	Inf
168	5.3455e-52		17.3	4.8113	Inf
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181 0.00035838	6.5253e-56	0	18.6	4.8113	Inf
182 0.00035107	3.2627e-56	0	18.7	4.8113	Inf
183	1.6313e-56		18.8	4.8113	Inf
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0.00033702 185	4.0783e-57	0	19	4.8113	Inf
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195	3.9827e-60	U	20	4.8113	Inf
0.00027113		0			_
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197	9.9568e-61	O	20.2	4.8113	Inf
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198 0.00025602	4.9784e-61	0	20.3	4.8113	Inf
199	2.4892e-61	Ü	20.4	4.8113	Inf
0.00025122	1 2446- 61	0	20 F	4 0112	T £
200 0.00024653	1.2446e-61	0	20.5	4.8113	Inf
201	6.223e-62		20.6	4.8113	Inf
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202 0.00023748	3.1115e-62	0	20.7	4.0113	Inf
203	1.5558e-62		20.8	4.8113	Inf
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0.00022884	7.7700e 03	0	20.5	4.0115	1111
205	3.8894e-63	0	21	4.8113	Inf
0.00022466 206	1.9447e-63	0	21.1	4.8113	Inf
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207	9.7235e-64	^	21.2	4.8113	Inf
0.0002166 208	4.8617e-64	0	21.3	4.8113	Inf
0.0002127		0			
209	2.4309e-64	0	21.4	4.8113	Inf
210	1.2154e-64	U	21.5	4.8113	Inf
0.00020516	6 0000 65	0	01.6	4 0112	- 6
211 0.00020152	6.0772e-65	0	21.6	4.8113	Inf
212	3.0386e-65	ŭ	21.7	4.8113	Inf
0.00019796	1 [100] (5	0	01 0	4 0112	T - C
213 0.00019448	1.5193e-65	0	21.8	4.8113	Inf
214	7.5965e-66		21.9	4.8113	Inf
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216	1.8991e-66	_	22.1	4.8113	Inf
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0.00013408 236	1.8111e-72	0	24.1	4.8113	Inf
0.00013194	9.0557e-73	0	24.2	4.8113	Inf
0.00012984	4.5278e-73	0	24.3	4.8113	Inf
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0.00012577		0	24.5	4.8113	
240 0.00012379	1.132e-73	0			Inf
241 0.00012185	5.6598e-74	0	24.6	4.8113	Inf
242 0.00011995	2.8299e-74	0	24.7	4.8113	Inf
243 0.00011808	1.4149e-74	0	24.8	4.8113	Inf
244 0.00011625	7.0747e-75	0	24.9	4.8113	Inf
245 0.00011446	3.5374e-75	0	25	4.8113	Inf
246	1.7687e-75		25.1	4.8113	Inf
0.0001127 247	8.8434e-76	0	25.2	4.8113	Inf
0.00011098		0			

0 0	248	4.4217e-76	25.3	4.8113	Inf	
	249	2.2109e-76	25.4	4.8113	Inf	
	250 0010763	1.1054e-76	25.5	4.8113	Inf	
	251	0 5.5271e-77	25.6	4.8113	Inf	
	252	0 2.7636e-77	25.7	4.8113	Inf	
	253 253	0 1.3818e-77	25.8	4.8113	Inf	
	00010129 254	0 6.9089e-78	25.9	4.8113	Inf	9.9783e-
05	255	0 3.4545e-78	26	4.8113	Inf	9.8301e-
05	256	0 1.7272e-78	26.1	4.8113	Inf	9.6847e-
05	257	0 8.6362e-79	26.2	4.8113	Inf	9.5419e-
05	258	0 4.3181e-79	26.3	4.8113	Inf	9.4017e-
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05	260	0 1.0795e-79	26.5	4.8113	Inf	9.1291e-
05	261	0 5.3976e-80	26.6	4.8113	Inf	8.9965e-
05	262	0 2.6988e-80	26.7	4.8113	Inf	8.8662e-
05	263	0 1.3494e-80	26.8	4.8113	Inf	8.7384e-
05	264	0 6.747e-81	26.9	4.8113	Inf	8.6128e-
05	265	0 3.3735e-81	27	4.8113	Inf	8.4895e-
05	266	0 1.6868e-81	27.1	4.8113	Inf	8.3683e-
05		0				
05	267	8.4338e-82 0	27.2	4.8113	Inf	8.2494e-
05	268	4.2169e-82 0	27.3	4.8113	Inf	8.1325e-
05	269	2.1084e-82 0	27.4	4.8113	Inf	8.0177e-
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05	275	3.2944e-84 0	28	4.8113	Inf	7.3698e-
05	276	1.6472e-84 0	28.1	4.8113	Inf	7.2683e-
-						

05	277	8.2361e-85 0	28.2	4.8113	Inf	7.1685e-
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05	279	2.059e-85	28.4	4.8113	Inf	6.974e-
	280	0 1.0295e-85	28.5	4.8113	Inf	6.8792e-
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05	296	0 1.5709e-90	30.1	4.8113	Inf	5.5607e-
05	297	0 7.8545e-91	30.1	4.8113		5.4893e-
05		0 3.9273e-91	30.2		Inf	
05	298	0		4.8113	Inf	5.419e-
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05	303	1.2273e-92 0	30.8	4.8113	Inf	5.0839e-
05	304	6.1364e-93 0	30.9	4.8113	Inf	5.02e-
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05	307	7.6705e-94 0	31.2	4.8113	Inf	4.8343e-
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05	328	0 3.6576e-100	33.3	4.8113	Inf	3.7486e-
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05	330	0 9.1439e-101	33.5	4.8113	Inf	3.6619e-
05	331	0 4.5719e-101	33.6	4.8113	Inf	3.6195e-
05	332	0 2.286e-101	33.7	4.8113	Inf	3.5777e-
05	333	0 1.143e-101	33.8	4.8113	Inf	3.5365e-
05	334	0 5.7149e-102	33.9	4.8113	Inf	3.4959e-
05		0	-0.0	- • • • • • •		2.13030

05	335	2.8575e-102 0	34	4.8113	Inf	3.4559e-
	336	1.4287e-102	34.1	4.8113	Inf	3.4164e-
05	337	0 7.1437e-103	34.2	4.8113	Inf	3.3775e-
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05	339	0 1.7859e-103	34.4	4.8113	Inf	3.3014e-
05	340	0 8.9296e-104	34.5	4.8113	Inf	3.2641e-
05	341	0 4.4648e-104	34.6	4.8113	Inf	3.2274e-
05	342	0 2.2324e-104	34.7	4.8113	Inf	3.1911e-
05		0				
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	348	3.4881e-106	35.3	4.8113	Inf	2.9841e-
05	349	0 1.7441e-106	35.4	4.8113	Inf	2.9513e-
05	350	0 8.7203e-107	35.5	4.8113	Inf	2.9189e-
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05	353	0 1.09e-107	35.8	4.8113	Inf	2.8243e-
05	354	0 5.4502e-108	35.9	4.8113	Inf	2.7937e-
05		0				
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05	356	1.3625e-108 0	36.1	4.8113	Inf	2.7336e-
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NaN	358	-35.3 0	42053	NaN	NaN	

Diferenciacion hacia atras

[Warning: Unable to solve symbolically. Returning a numeric
solution using

<a href="matlab:web(fullfile(docroot,

^{&#}x27;symbolic/vpasolve.html'))">vpasolve.]

^{[&}gt; In <a

href="matlab:matlab.internal.language.introspective.errorDocCallback('sym
/solve', 'C:\Program

Files\Polyspace\R2020a\toolbox\symbolic\symbolic\@sym\solve.m', 304)"

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Files\Polyspace\R2020a\toolbox\symbolic\symbolic\@sym\solve.m',304,0)">li
ne 304 < /a >)
 In <a
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ff/pInflexion', 'C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
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 In <a
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opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m',53,0)">line 53</a>)]
    <strong>i</strong>
                              <strong>hi</strong>
<strong>f(hi)</strong>
                            <strong>Ea</strong>
<strong>Er</strong>
                             <strong>Rt</strong>
<strong>Derivada</strong>
<strong>___</strong> <strong>____</strong>
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                                              </strong>
<strong>_____</strong> <strong>____</strong>
<strong> </strong>
                          0.6
                                      1.2742
                                                     36.025
     1
                  0.1
21.803
              3.537
                          0.7
                0.05
                                     0.44366
                                                    10.158
15.129
              4.3676
                                       0.1342
     3
               0.025
                          0.8
                                                    2.8693
              4.6771
10.934
                                    0.037201
              0.0125
                          0.9
                                                   0.77923
              4.7741
8.1528
     5
             0.00625
                           1
                                    0.0098162
                                                   0.20444
6.2314
              4.8014
             0.003125
     6
                          1.1
                                  0.0025228
                                                   0.052463
             4.8087
4.8605
            0.0015625
                          1.2 0.00063958
                                                 0.013295
3.8564
              4.8106
                          1.3
     8
           0.00078125
                                  0.00016102
                                                 0.0033469
3.1045
              4.8111
           0.00039063
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    11
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1.7367
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    12
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1.4584

4.8113

1.2344	13	2.4414e-05	1.8	1.5833e-07	3.2908e-06
15 6.1035e-06 2 4.0524 534.05 0.90297 0.75881 -37.607 -88.657 0.77946 42.418 -2.2 -414.97 -98.854 0.67656 419.78 -100.21 -98.854 18 7.6294e-07 2.3 2282.3 -100.21 0.59023 -2277.5 -26553 -20 1.9073e-07 2.4 26558 -100.02 0.51736 -26553 -20 1.9073e-07 2.5 -1.4607e+05 -99.997 0.45547 1.4607e+05 -99.997 -1.4607e+05 -99.997 -1.4607e+05 -99.997 0.45547 1.4607e+05 -99.997 -1.4607e+05 -99.9997 -1.4607e+05 -99.9997 0.45547 1.4607e+06 -2 4.7684e-08 2.7 9.3485e+06 -100 0.35727 -9.3485e+06 2.7 9.3485e+06 -100 -100 0.31817 -1.0878e+08 2.9 -5.983e+08 -100 0.2843 5.983e+08 -100 <td>1.2344 14</td> <td>4.8113 1.2207e-05</td> <td>1.9</td> <td>3.9586e-08</td> <td>8.2278e-07</td>	1.2344 14	4.8113 1.2207e-05	1.9	3.9586e-08	8.2278e-07
0.90297 0.75881 16 3.0518e-06 2.1 -37.607 -88.657 0.77946 42.418 17 1.5259e-06 2.2 -414.97 -98.854 0.67656 419.78 -100.21 -20.22 -20.25 -1.4607e+05 -99.997 -99.997 -40.22 -1.6997e+06 -100 -100 -20.26.22 1.6864e-08 2.7 9.3485e+06 -100 -100 -20.21 -2.8512e+08 2.8 1.0878e+08 -100 -100 -20.2843 5.983e+08 -100 -20.2843			2	4.0524	534.05
0.77946 42.418 1 1.5259e-06 2.2 -414.97 -98.854 0.67656 419.78 -100.21 -100.21 0.59023 -2277.5 -26553 -26553 -20 1.9073e-07 2.4 26558 -100.02 0.51736 -26553 20 1.9073e-07 2.5 -1.4607e+05 -99.997 0.45547 1.4607e+05 2.6 -1.6997e+06 -100 21 9.5367e-08 2.6 -1.6997e+06 -100 0.40262 1.6997e+06 2.7 9.3485e+06 -100 0.35727 -9.3485e+06 -100 0.35727 -9.3485e+06 -100 0.31817 -1.0878e+08 2.9 -5.983e+08 -100 0.2843 5.983e+08 -100 0.25485 6.962e+09 3 -6.962e+09 -100 0.25485 6.962e+09 3.1 3.8291e+10 -100 0.22913 -3.8291e+10 -100 0.22059 -4.4557e+11 -100 0.2659 -4.4557e+11 -100 0.16676 2.4506e+10 3.3 -2.4506e+12 -100 0.16927 2.8517e+13 <td< td=""><td>0.90297</td><td>0.75881</td><td></td><td></td><td></td></td<>	0.90297	0.75881			
17 1.5259e-06 2.2 -414.97 -98.854 0.67656 419.78 3 2282.3 -100.21 0.59023 -2277.5 -26553 -100.02 0.51736 -26553 -26553 -20 1.9073e-07 2.5 -1.4607e+05 -99.997 0.45547 1.4607e+05 21 9.5367e-08 2.6 -1.6997e+06 -100 0.40262 1.6997e+06 22 4.7684e-08 2.7 9.3485e+06 -100 0.35727 -9.3485e+06 23 2.3842e-08 2.8 1.0878e+08 -100 0.31817 -1.0878e+08 2.9 -5.983e+08 -100 0.2843 5.983e+08 2.9 -5.983e+08 -100 0.25485 6.962e+09 3 -6.962e+09 -100 0.22913 -3.8291e+10 -100 -100 0.22913 -3.8291e+10 3.3 -2.4506e+12 -100 0.18676 2.45506e+12 -100 -100 0.18676 2.8517e+13 -100 -100 0.15378 -1.5684e+14 -100			2.1	-37.607	-88.657
18 7.6294e-07 2.3 2282.3 -100.21 0.59023 -2277.5 2.4 26558 -100.02 0.51736 -26553 -26553 -20 1.9073e-07 2.5 -1.4607e+05 -99.997 0.45547 1.4607e+05 21 9.5367e-08 2.6 -1.6997e+06 -100 0.40262 1.6997e+06 22 4.7684e-08 2.7 9.3485e+06 -100 0.35727 -9.3485e+06 23 2.3842e-08 2.8 1.0878e+08 -100 0.31817 -1.0878e+08 24 1.1921e-08 2.9 -5.983e+08 -100 0.2843 5.983e+08 2.9 -5.983e+08 -100 0.25485 6.962e+09 3.1 3.8291e+10 -100 0.25485 6.962e+09 3.1 3.8291e+10 -100 0.20659 -4.4557e+11 -100 -100 0.20659 -4.4557e+11 -100 0.18676 2.4506e+12 -100 -100 29 3.7253e=10 3.4 -2.8517e+13 -100 30 1		1.5259e-06	2.2	-414.97	-98.854
19	18	7.6294e-07	2.3	2282.3	-100.21
20 1.9073e-07 2.5 -1.4607e+05 -99.997 0.45547 1.4607e+05 -1.6997e+06 -100 0.40262 1.6997e+06 -2.47684e-08 2.7 9.3485e+06 -100 0.35727 -9.3485e+06 23 2.3842e-08 2.8 1.0878e+08 -100 0.31817 -1.0878e+08 24 1.1921e-08 2.9 -5.983e+08 -100 0.2843 5.9805e-09 3 -6.962e+09 -100 0.25485 6.962e+09 3.1 3.8291e+10 -100 0.22913 -3.8291e+10 -100 -100 0.20659 -4.4557e+11 -100 0.18676 2.4506e+12 -100 0.18676 2.4506e+12 -100 0.18676 2.8517e+13 -100 0.15378 -1.5684e+14 -100 31 9.3132e-11 3.6 1.8251e+15 -100 0.14004 -1.8251e+15 -100 0.11687 1.168e+17 3 -1.0038e+16 <			2.4	26558	-100.02
0.45547 1.4607e+05 21 9.5367e-08 2.6 -1.6997e+06 -100 0.40262 1.6997e+06 22 4.7684e-08 2.7 9.3485e+06 -100 0.35727 -9.3485e+06 23 2.3842e-08 2.8 1.0878e+08 -100 0.31817 -1.0878e+08 -100 -100 -100 0.2843 5.983e+08 -100 -100 0.2843 5.9605e-09 3 -6.962e+09 -100 0.25485 6.962e+09 3.1 3.8291e+10 -100 0.22913 -3.8291e+10 -100 -100 0.20559 -4.4557e+11 -100 0.18676 2.4506e+12 -100 29 3.7253e-10 3.4 -2.4506e+12 -100 0.16927 2.8517e+13 -100 0.16927 2.8517e+13 -100 -100 0.14004 -1.8251e+15 -100 0.14004 -1.8251e+15 -100 0.1278 1.0038e+16 3 2.3283e-11 3.8 -1.168e+17 -100 0.11687 <t< td=""><td></td><td></td><td>2 5</td><td>1 46070105</td><td>00 007</td></t<>			2 5	1 46070105	00 007
0.40262			2.3	-1.46076+05	-99.997
22 4.7684e-08 2.7 9.3485e+06 -100 0.35727 -9.3485e+06 23 2.3842e-08 2.8 1.0878e+08 -100 0.31817 -1.0878e+08 2.9 -5.983e+08 -100 24 1.1921e-08 2.9 -5.983e+08 -100 0.2843 5.983e+08 -25 5.9605e-09 3 -6.962e+09 -100 0.25485 6.962e+09 -2 26 2.9802e-09 3.1 3.8291e+10 -100 0.22913 -3.8291e+10 -100 -100 -100 0.20659 -4.4557e+11 -100 0.20659 -4.4557e+11 28 7.4506e+12 -100 -100 0.18676 2.4506e+12 -2.8517e+13 -100 -100 0.16927 2.8517e+13 -1.00 -100 0.15378 -1.5684e+14 -100 -1.5684e+14 -100 0.14004 -1.8251e+15 -100 -100 0.1278 1.0038e+16 3 2.3283e-11 3.8 -1.168e+17 -100 0.11687 1.168e+17 -100			2.6	-1.6997e+06	-100
23	22		2.7	9.3485e+06	-100
0.31817 -1.0878e+08 24 1.1921e-08 2.9 -5.983e+08 -100 0.2843 5.983e+08 25 5.9605e-09 3 -6.962e+09 -100 0.25485 6.962e+09 3.1 3.8291e+10 -100 0.22913 -3.8291e+10 -100 -100 0.22913 -3.8291e+10 -100 27 1.4901e-09 3.2 4.4557e+11 -100 0.20659 -4.4557e+11 -2.8517e+13 -100 0.18676 2.4506e+12 -100 0.18676 2.4506e+12 -100 0.16927 2.8517e+13 -100 0.15378 -1.5684e+14 -100 0.15378 -1.5684e+14 -100 0.14004 -1.8251e+15 -100 0.1278 1.0038e+16 -3 -1.0038e+16 -100 0.1278 1.0038e+16 -3 2.3283e-11 3.8 -1.168e+17 -100 0.11687 1.168e+17 -4 -4.74754e+18 -100 0.098317 -7.4754e+18 -4 7.4754e+18 -100			2 8	1 08780±08	_100
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25			2.9	-5.983e+08	-100
26	25	5.9605e-09	3	-6.962e+09	-100
0.22913			3.1	3.8291e+10	-100
0.20659	0.22913	-3.8291e+10			
28			3.2	4.4557e+11	-100
29	28	7.4506e-10	3.3	-2.4506e+12	-100
0.16927			3.4	-2.8517e+13	-100
0.15378	0.16927	2.8517e+13		4 560444	100
31 9.3132e-11 3.6 1.8251e+15 -100 0.14004 -1.8251e+15 32 4.6566e-11 3.7 -1.0038e+16 -100 0.1278 1.0038e+16 33 2.3283e-11 3.8 -1.168e+17 -100 0.11687 1.168e+17 34 1.1642e-11 3.9 6.4242e+17 -100 0.10709 -6.4242e+17 35 5.8208e-12 4 7.4754e+18 -100 0.098317 -7.4754e+18 36 2.9104e-12 4.1 -4.1115e+19 -100 0.090425 4.1115e+19 37 1.4552e-12 4.2 -4.7843e+20 -100 0.083312 4.7843e+20			3.5	1.5684e+14	-100
32 4.6566e-11 3.7 -1.0038e+16 -100 0.1278 1.0038e+16			3.6	1.8251e+15	-100
33 2.3283e-11 3.8 -1.168e+17 -100 0.11687 1.168e+17 3.9 6.4242e+17 -100 0.10709 -6.4242e+17 3.9 6.4242e+17 -100 0.098317 -7.4754e+18 -100 0.098317 -7.4754e+18 36 2.9104e-12 4.1 -4.1115e+19 -100 0.090425 4.1115e+19 37 1.4552e-12 4.2 -4.7843e+20 -100 0.083312 4.7843e+20			3.7	-1.0038e+16	-100
0.11687			2 0	1 160 - 117	100
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35 5.8208e-12 4 7.4754e+18 -100 0.098317 -7.4754e+18 36 2.9104e-12 4.1 -4.1115e+19 -100 0.090425 4.1115e+19 37 1.4552e-12 4.2 -4.7843e+20 -100 0.083312 4.7843e+20			3.9	6.4242e+17	-100
36 2.9104e-12 4.1 -4.1115e+19 -100 0.090425 4.1115e+19 -100 37 1.4552e-12 4.2 -4.7843e+20 -100 0.083312 4.7843e+20			4	7.4754e+18	-100
0.090425			<i>A</i> 1	_/ 11150+19	_100
0.083312 4.7843e+20		4.1115e+19		4.11136113	
			4.2	-4.7843e+20	-100
0 076006 2 6214-121	38	7.276e-13	4.3	2.6314e+21	-100
0.076886 -2.6314e+21 39 3.638e-13 4.4 3.0619e+22 -100			4.4	3.0619e+22	-100
0.07107 -3.0619e+22 40 1.819e-13 4.5 -1.6841e+23 -100			45	-1 68416+23	_100
0.065794 1.6841e+23	0.065794	1.6841e+23			
41 9.0949e-14 4.6 -1.9596e+24 -100 0.061001 1.9596e+24			4.6	-1.9596e+24	-100

42	4.5475e-14	4.7	1.0778e+25	-100
0.056636 43	-1.0778e+25 2.2737e-14	4.8	1.2542e+26	-100
0.052657 44	-1.2542e+26 1.1369e-14	4.9	-6.8979e+26	-100
0.049021	6.8979e+26 5.6843e-15	5	-9.2909e+29	-100
0.045694	9.2909e+29			
46 0.042646	2.8422e-15 2.4682e+30	5.1	-2.4682e+30	-100
47 0.039847	1.4211e-15 0	5.2	4.8113	Inf
48	7.1054e-16	5.3	4.8113	Inf
0.037275 49	0 3.5527e-16	5.4	4.8113	Inf
0.034908 50	0 1.7764e-16	5.5	4.8113	Inf
0.032726 51	0 8.8818e-17	5.6	4.8113	Inf
0.030712	0			
52 0.028851	4.4409e-17 0	5.7	4.8113	Inf
53 0.027129	2.2204e-17 0	5.8	4.8113	Inf
54 0.025533	1.1102e-17 0	5.9	4.8113	Inf
55	5.5511e-18	6	4.8113	Inf
0.024054 56	0 2.7756e-18	6.1	4.8113	Inf
0.02268 57	0 1.3878e-18	6.2	4.8113	Inf
0.021403	0 6.9389e-19	6.3	4.8113	Inf
0.020215	0			
59 0.019108	3.4694e-19 0	6.4	4.8113	Inf
60 0.018076	1.7347e-19 0	6.5	4.8113	Inf
61 0.017112	8.6736e-20 0	6.6	4.8113	Inf
62	4.3368e-20	6.7	4.8113	Inf
0.016213	0 2.1684e-20	6.8	4.8113	Inf
0.015371 64	0 1.0842e-20	6.9	4.8113	Inf
0.014584	0 5.421e-21	7	4.8113	Inf
0.013846	0			
66 0.013155	2.7105e-21 0	7.1	4.8113	Inf
67 0.012506	1.3553e-21 0	7.2	4.8113	Inf
68 0.011897	6.7763e-22 0	7.3	4.8113	Inf
69	3.3881e-22	7.4	4.8113	Inf
0.011324 70	0 1.6941e-22	7.5	4.8113	Inf
0.010785	0			

71	8.4703e-23	7.6	4.8113	Inf
0.010279 72	0 4.2352e-23	7.7	4.8113	Inf
0.0098011	0			
73 0.0093511	2.1176e-23	7.8	4.8113	Inf
74	1.0588e-23	7.9	4.8113	Inf
0.0089267 75	0 5.294e-24	8	4.8113	Inf
0.0085261 76	0 2.647e-24	8.1	4.8113	Inf
0.0081477	0			1111
77 0.0077901	1.3235e-24	8.2	4.8113	Inf
78	6.6174e-25	8.3	4.8113	Inf
0.0074519 79	0 3.3087e-25	8.4	4.8113	Inf
0.0071319	0 1.6544e-25	8.5	4.8113	Inf
0.0068289	0			T11T
81 0.0065418	8.2718e-26 0	8.6	4.8113	Inf
82	4.1359e-26	8.7	4.8113	Inf
0.0062697 83	0 2.068e-26	8.8	4.8113	Inf
0.0060116 84	0 1.034e-26	8.9	4.8113	Inf
0.0057666	0			
85 0.005534	5.1699e-27 0	9	4.8113	Inf
86	2.5849e-27	9.1	4.8113	Inf
0.005313 87	0 1.2925e-27	9.2	4.8113	Inf
0.0051029	0 6.4623e-28	9.3	4.8113	Inf
0.0049032	0			
89 0.0047131	3.2312e-28 0	9.4	4.8113	Inf
90	1.6156e-28	9.5	4.8113	Inf
0.0045321 91	0 8.0779e-29	9.6	4.8113	Inf
0.0043598 92	0 4.039e-29	9.7	4.8113	Inf
0.0041955	0			
93 0.004039	2.0195e-29 0	9.8	4.8113	Inf
94	1.0097e-29	9.9	4.8113	Inf
0.0038896 95	0 5.0487e-30	10	4.8113	Inf
0.0037471 96	0 2.5244e-30	10.1	4.8113	Inf
0.0036111	0			
97 0.0034812	1.2622e-30 0	10.2	4.8113	Inf
98 0.0033571	6.3109e-31	10.3	4.8113	Inf
99	3.1554e-31	10.4	4.8113	Inf
0.0032385	0			

100	1.5777e-31	10.5	4.8113	Inf
0.0031251	0 7.8886e-32	10.6	4.8113	Inf
0.0030166	0			
102 0.0029127	3.9443e-32 0	10.7	4.8113	Inf
103	1.9722e-32	10.8	4.8113	Inf
0.0028133	0 9.8608e-33	10.9	4.8113	Inf
0.0027181	0	10.5		
105 0.0026269	4.9304e-33	11	4.8113	Inf
106	2.4652e-33	11.1	4.8113	Inf
0.0025395	1 2226- 22	11 0	4 0112	T., £
107 0.0024557	1.2326e-33 0	11.2	4.8113	Inf
108	6.163e-34	11.3	4.8113	Inf
0.0023753	0 3.0815e-34	11.4	4.8113	Inf
0.0022982	0			
110 0.0022242	1.5407e-34	11.5	4.8113	Inf
111	7.7037e-35	11.6	4.8113	Inf
0.0021532 112	0 3.8519e-35	11.7	4.8113	Inf
0.002085	0	11.7	4.0113	Inf
113	1.9259e-35	11.8	4.8113	Inf
0.0020194 114	0 9.6296e-36	11.9	4.8113	Inf
0.0019564	0			
115 0.0018959	4.8148e-36	12	4.8113	Inf
116	2.4074e-36	12.1	4.8113	Inf
0.0018376	0 1.2037e-36	12.2	A 0112	Inf
117 0.0017816	1.20376-30	12.2	4.8113	Inf
118	6.0185e-37	12.3	4.8113	Inf
0.0017277 119	0 3.0093e-37	12.4	4.8113	Inf
0.0016759	0			
120 0.0016259	1.5046e-37	12.5	4.8113	Inf
121	7.5232e-38	12.6	4.8113	Inf
0.0015778 122	0 3.7616e-38	12.7	4.8113	Inf
0.0015315	0	12.7	4.0113	1111
123	1.8808e-38	12.8	4.8113	Inf
0.0014869 124	0 9.404e-39	12.9	4.8113	Inf
0.0014439	0	1.0		
125 0.0014024	4.702e-39 0	13	4.8113	Inf
126	2.351e-39	13.1	4.8113	Inf
0.0013624 127	0 1.1755e-39	13.2	4.8113	Inf
0.0013238	1.1755e 59 0	⊥ 少• ८	1.0113	1111
128	5.8775e-40	13.3	4.8113	Inf
0.0012866	0			

129	2.9387e-40	0	13.4	4.8113	Inf
0.0012507	1.4694e-40		13.5	4.8113	Inf
0.001216	7.3468e-41		13.6	4.8113	Inf
0.0011825 132	3.6734e-41	0	13.7	4.8113	Inf
0.0011502	1.8367e-41	0	13.8	4.8113	Inf
0.0011189	9.1835e-42	0	13.9	4.8113	Inf
0.0010887		0			
135 0.0010595	4.5918e-42	0	14	4.8113	Inf
136 0.0010313	2.2959e-42	0	14.1	4.8113	Inf
137 0.0010041	1.1479e-42	0	14.2	4.8113	Inf
138	5.7397e-43		14.3	4.8113	Inf
0.00097769	2.8699e-43	0	14.4	4.8113	Inf
0.00095218 140	1.4349e-43	0	14.5	4.8113	Inf
0.00092749	7.1746e-44	0	14.6	4.8113	Inf
0.00090359		0			
142 0.00088047	3.5873e-44	0	14.7	4.8113	Inf
143 0.00085807	1.7937e-44	0	14.8	4.8113	Inf
144 0.00083639	8.9683e-45	0	14.9	4.8113	Inf
145	4.4842e-45		15	4.8113	Inf
0.00081538 146	2.2421e-45	0	15.1	4.8113	Inf
0.00079503	1.121e-45	0	15.2	4.8113	Inf
0.00077531	5.6052e-46	0	15.3	4.8113	Inf
0.0007562		0			
149 0.00073768	2.8026e-46	0	15.4	4.8113	Inf
150 0.00071972	1.4013e-46	0	15.5	4.8113	Inf
151	7.0065e-47	•	15.6	4.8113	Inf
0.0007023 152	3.5032e-47	0	15.7	4.8113	Inf
0.0006854 153	1.7516e-47	0	15.8	4.8113	Inf
0.00066901 154	8.7581e-48	0	15.9	4.8113	Inf
0.00065311		0			
155 0.00063768	4.3791e-48	0	16	4.8113	Inf
156 0.0006227	2.1895e-48	0	16.1	4.8113	Inf
157 0.00060816	1.0948e-48		16.2	4.8113	Inf
0.00000010		0			

158 0.00059404	5.4738e-49	0	16.3	4.8113	Inf
159	2.7369e-49		16.4	4.8113	Inf
0.00058033	1.3685e-49	0	16.5	4.8113	Inf
0.00056701	6.8423e-50	0	16.6	4.8113	Inf
0.00055407	3.4211e-50	0	16.7	4.8113	Inf
0.0005415		0			
163 0.00052928	1.7106e-50	0	16.8	4.8113	Inf
164 0.00051741	8.5528e-51	0	16.9	4.8113	Inf
165	4.2764e-51		17	4.8113	Inf
0.00050586 166	2.1382e-51	0	17.1	4.8113	Inf
0.00049464 167	1.0691e-51	0	17.2	4.8113	Inf
0.00048373		0			
168 0.00047311	5.3455e-52	0	17.3	4.8113	Inf
169 0.00046279	2.6728e-52	0	17.4	4.8113	Inf
170	1.3364e-52		17.5	4.8113	Inf
0.00045274 171	6.6819e-53	0	17.6	4.8113	Inf
0.00044297 172	3.341e-53	0	17.7	4.8113	Inf
0.00043346 173	1.6705e-53	0	17.8	4.8113	Inf
0.0004242		0			
174 0.00041519	8.3524e-54	0	17.9	4.8113	Inf
175 0.00040642	4.1762e-54	0	18	4.8113	Inf
176	2.0881e-54	0	18.1	4.8113	Inf
0.00039787 177	1.044e-54		18.2	4.8113	Inf
0.00038956 178	5.2202e-55	0	18.3	4.8113	Inf
0.00038145 179	2.6101e-55	0	18.4	4.8113	Inf
0.00037356		0			
180 0.00036587	1.3051e-55	0	18.5	4.8113	Inf
181 0.00035838	6.5253e-56	0	18.6	4.8113	Inf
182 0.00035107	3.2627e-56	0	18.7	4.8113	Inf
183	1.6313e-56		18.8	4.8113	Inf
0.00034396	8.1566e-57	0	18.9	4.8113	Inf
0.00033702 185	4.0783e-57	0	19	4.8113	Inf
0.00033025		0			
186 0.00032366	2.0392e-57	0	19.1	4.8113	Inf

1 0 7	1 0106- 57		100	4 0110	Ŧ . C
187 0.00031723	1.0196e-57	0	19.2	4.8113	Inf
188 0.00031096	5.0979e-58	0	19.3	4.8113	Inf
189	2.5489e-58		19.4	4.8113	Inf
0.00030484 190	1.2745e-58	0	19.5	4.8113	Inf
0.00029887 191	6.3724e-59	0	19.6	4.8113	Inf
0.00029305	3.1862e-59	0	19.7	4.8113	Inf
0.00028737	1.5931e-59	0	19.8	4.8113	Inf
0.00028182		0			
194 0.00027641	7.9655e-60	0	19.9	4.8113	Inf
195 0.00027113	3.9827e-60	0	20	4.8113	Inf
196 0.00026597	1.9914e-60	0	20.1	4.8113	Inf
197	9.9568e-61		20.2	4.8113	Inf
0.00026094 198	4.9784e-61	0	20.3	4.8113	Inf
0.00025602 199	2.4892e-61	0	20.4	4.8113	Inf
0.00025122	1.2446e-61	0	20.5	4.8113	Inf
0.00024653		0			
201 0.00024195	6.223e-62	0	20.6	4.8113	Inf
202 0.00023748	3.1115e-62	0	20.7	4.8113	Inf
203 0.00023311	1.5558e-62	0	20.8	4.8113	Inf
204	7.7788e-63		20.9	4.8113	Inf
0.00022884	3.8894e-63	0	21	4.8113	Inf
0.00022466 206	1.9447e-63	0	21.1	4.8113	Inf
0.00022058	9.7235e-64	0	21.2	4.8113	Inf
0.0002166	4.8617e-64	0	21.3	4.8113	Inf
0.0002127		0			
209 0.00020889	2.4309e-64	0	21.4	4.8113	Inf
210 0.00020516	1.2154e-64	0	21.5	4.8113	Inf
211 0.00020152	6.0772e-65	0	21.6	4.8113	Inf
212	3.0386e-65		21.7	4.8113	Inf
0.00019796	1.5193e-65	0	21.8	4.8113	Inf
0.00019448 214	7.5965e-66	0	21.9	4.8113	Inf
0.00019107 215	3.7982e-66	0	22	4.8113	Inf
0.00018774		0		1.0110	

216	1.8991e-66		22.1	4.8113	Inf
0.00018448 217	9.4956e-67	0	22.2	4.8113	Inf
0.00018129	4.7478e-67	0	22.3	4.8113	Inf
0.00017817		0			
219 0.00017511	2.3739e-67	0	22.4	4.8113	Inf
220 0.00017212	1.1869e-67	0	22.5	4.8113	Inf
221 0.0001692	5.9347e-68	0	22.6	4.8113	Inf
222	2.9674e-68	0	22.7	4.8113	Inf
0.00016633	1.4837e-68		22.8	4.8113	Inf
0.00016353	7.4184e-69	0	22.9	4.8113	Inf
0.00016079 225	3.7092e-69	0	23	4.8113	Inf
0.0001581 226	1.8546e-69	0	23.1	4.8113	Inf
0.00015547		0			
227 0.00015289	9.273e-70	0	23.2	4.8113	Inf
228 0.00015037	4.6365e-70	0	23.3	4.8113	Inf
229 0.00014789	2.3183e-70	0	23.4	4.8113	Inf
230	1.1591e-70		23.5	4.8113	Inf
0.00014547	5.7956e-71	0	23.6	4.8113	Inf
0.0001431 232	2.8978e-71	0	23.7	4.8113	Inf
0.00014078	1.4489e-71	0	23.8	4.8113	Inf
0.0001385		0			
234 0.00013627	7.2445e-72	0	23.9	4.8113	Inf
235 0.00013408	3.6223e-72	0	24	4.8113	Inf
236 0.00013194	1.8111e-72	0	24.1	4.8113	Inf
237	9.0557e-73	0	24.2	4.8113	Inf
0.00012984	4.5278e-73		24.3	4.8113	Inf
0.00012778 239	2.2639e-73	0	24.4	4.8113	Inf
0.00012577	1.132e-73	0	24.5	4.8113	Inf
0.00012379	5.6598e-74	0	24.6	4.8113	Inf
0.00012185		0			
242 0.00011995	2.8299e-74	0	24.7	4.8113	Inf
243 0.00011808	1.4149e-74	0	24.8	4.8113	Inf
244 0.00011625	7.0747e-75	0	24.9	4.8113	Inf
3.00011020		J			

0.0	245 0011446	3.5374e-75	25	4.8113	Inf	
	246 001127	1.7687e-75		4.8113	Inf	
	247 0011098	8.8434e-76	25.2	4.8113	Inf	
	248	4.4217e-76	25.3	4.8113	Inf	
	0010929	0 2.2109e-76	25.4	4.8113	Inf	
	0010763 250	0 1.1054e-76		4.8113	Inf	
	00106 251	0 5.5271e-77	25.6	4.8113	Inf	
	001044 252	0 2.7636e-77	25.7	4.8113	Inf	
0.0	0010283 253	0 1.3818e-77	25.8	4.8113	Inf	
0.0	0010129 254	0 6.9089e-78	25.9	4.8113	Inf	9.9783e-
05	255	0 3.4545e-78	26	4.8113	Inf	9.8301e-
05	256	0 1.7272e-78	26.1	4.8113	Inf	9.6847e-
05	257	0 8.6362e-79	26.2	4.8113	Inf	9.5419e-
05	258	0 4.3181e-79	26.3	4.8113	Inf	9.4017e-
05	259	0 2.159e-79	26.4	4.8113	Inf	9.2642e-
05	260	0 1.0795e-79	26.5	4.8113	Inf	9.1291e-
05	261	0 5.3976e-80	26.6	4.8113	Inf	8.9965e-
05	262	0 2.6988e-80	26.7	4.8113	Inf	8.8662e-
05	263	0 1.3494e-80				
05		0	26.8	4.8113	Inf	8.7384e-
05	264	6.747e-81 0		4.8113	Inf	8.6128e-
05	265	3.3735e-81 0	27	4.8113	Inf	8.4895e-
05	266	1.6868e-81 0	27.1	4.8113	Inf	8.3683e-
05	267	8.4338e-82 0	27.2	4.8113	Inf	8.2494e-
05	268	4.2169e-82 0	27.3	4.8113	Inf	8.1325e-
05	269	2.1084e-82 0	27.4	4.8113	Inf	8.0177e-
05	270	1.0542e-82 0	27.5	4.8113	Inf	7.9049e-
05	271	5.2711e-83 0	27.6	4.8113	Inf	7.7941e-
05	272	2.6355e-83 0	27.7	4.8113	Inf	7.6852e-
05	273	1.3178e-83	27.8	4.8113	Inf	7.5782e-
		-				

05	274	6.5889e-84 0	27.9	4.8113	Inf	7.4731e-
05	275	3.2944e-84 0	28	4.8113	Inf	7.3698e-
05	276	1.6472e-84	28.1	4.8113	Inf	7.2683e-
05	277	8.2361e-85 0	28.2	4.8113	Inf	7.1685e-
05	278	4.118e-85	28.3	4.8113	Inf	7.0704e-
	279	0 2.059e-85	28.4	4.8113	Inf	6.974e-
05	280	0 1.0295e-85	28.5	4.8113	Inf	6.8792e-
05	281	0 5.1476e-86	28.6	4.8113	Inf	6.7861e-
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05	284	0 6.4344e-87	28.9	4.8113	Inf	6.5159e-
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05	288	0 4.0215e-88	29.3	4.8113	Inf	6.1762e-
05		0				
05	289	2.0108e-88 0	29.4	4.8113	Inf	6.0947e-
05	290	1.0054e-88 0	29.5	4.8113	Inf	6.0146e-
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05	292	2.5135e-89 0	29.7	4.8113	Inf	5.8583e-
05	293	1.2567e-89 0	29.8	4.8113	Inf	5.7821e-
05	294	6.2836e-90 0	29.9	4.8113	Inf	5.7071e-
05	295	3.1418e-90 0	30	4.8113	Inf	5.6333e-
05	296	1.5709e-90 0	30.1	4.8113	Inf	5.5607e-
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05	298	3.9273e-91 0	30.3	4.8113	Inf	5.419e-
	299	1.9636e-91	30.4	4.8113	Inf	5.3498e-
05	300	0 9.8182e-92	30.5	4.8113	Inf	5.2817e-
05	301	0 4.9091e-92	30.6	4.8113	Inf	5.2147e-
05	302	0 2.4545e-92	30.7	4.8113	Inf	5.1488e-
05		0				

05	303	1.2273e-92 0	30.8	4.8113	Inf	5.0839e-
05	304	6.1364e-93 0	30.9	4.8113	Inf	5.02e-
05	305	3.0682e-93 0	31	4.8113	Inf	4.9571e-
05	306	1.5341e-93 0	31.1	4.8113	Inf	4.8952e-
05	307	7.6705e-94 0	31.2	4.8113	Inf	4.8343e-
	308	3.8352e-94	31.3	4.8113	Inf	4.7743e-
05	309	0 1.9176e-94	31.4	4.8113	Inf	4.7153e-
05	310	0 9.5881e-95	31.5	4.8113	Inf	4.6571e-
05	311	0 4.794e-95	31.6	4.8113	Inf	4.5999e-
05	312	0 2.397e-95	31.7	4.8113	Inf	4.5435e-
05	313	0 1.1985e-95	31.8	4.8113	Inf	4.488e-
05	314	0 5.9925e-96	31.9	4.8113	Inf	4.4333e-
05	315	0 2.9963e-96	32	4.8113	Inf	4.3795e-
05	316	0 1.4981e-96	32.1	4.8113	Inf	4.3264e-
05	317	0 7.4907e-97	32.2	4.8113	Inf	4.2742e-
05	318	0 3.7453e-97	32.3	4.8113	Inf	4.2228e-
05	319	0 1.8727e-97	32.4	4.8113	Inf	4.1721e-
05	320	0 9.3634e-98	32.5	4.8113	Inf	4.1222e-
05	321	0 4.6817e-98	32.6	4.8113	Inf	
05	322	0 2.3408e-98	32.7	4.8113	Inf	4.0246e-
05	323	0 1.1704e-98	32.8	4.8113		3.9769e-
05		0			Inf	
05	324	5.8521e-99 0	32.9	4.8113	Inf	3.9298e-
05	325	2.926e-99 0	33	4.8113	Inf	3.8835e-
05	326	1.463e-99 0	33.1	4.8113	Inf	3.8379e-
05	327	7.3151e-100 0	33.2	4.8113	Inf	3.7929e-
05	328	3.6576e-100 0	33.3	4.8113	Inf	3.7486e-
05	329	1.8288e-100 0	33.4	4.8113	Inf	3.7049e-
05	330	9.1439e-101 0	33.5	4.8113	Inf	3.6619e-
05	331	4.5719e-101 0	33.6	4.8113	Inf	3.6195e-
		-				

05	332	2.286e-101 0	33.7	4.8113	Inf	3.5777e-
05	333	1.143e-101 0	33.8	4.8113	Inf	3.5365e-
05	334	5.7149e-102 0	33.9	4.8113	Inf	3.4959e-
05	335	2.8575e-102 0	34	4.8113	Inf	3.4559e-
05	336	1.4287e-102 0	34.1	4.8113	Inf	3.4164e-
05	337	7.1437e-103	34.2	4.8113	Inf	3.3775e-
05	338	3.5718e-103 0	34.3	4.8113	Inf	3.3392e-
	339	1.7859e-103	34.4	4.8113	Inf	3.3014e-
05	340	0 8.9296e-104	34.5	4.8113	Inf	3.2641e-
05	341	0 4.4648e-104	34.6	4.8113	Inf	3.2274e-
05	342	0 2.2324e-104	34.7	4.8113	Inf	3.1911e-
05	343	0 1.1162e-104	34.8	4.8113	Inf	3.1554e-
05	344	0 5.581e-105	34.9	4.8113	Inf	3.1202e-
05	345	0 2.7905e-105	35	4.8113	Inf	3.0855e-
05	346	0 1.3952e-105	35.1	4.8113	Inf	3.0512e-
05	347	0 6.9762e-106	35.2	4.8113	Inf	3.0174e-
05	348	0 3.4881e-106	35.3	4.8113	Inf	2.9841e-
05	349	0 1.7441e-106	35.4	4.8113	Inf	2.9513e-
05	350	0 8.7203e-107	35.5	4.8113	Inf	2.9189e-
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05	352	0 2.1801e-107	35.7	4.8113	Inf	2.8554e-
05	353	0 1.09e-107	35.8	4.8113	Inf	2.8243e-
05	354	0 5.4502e-108	35.9	4.8113	Inf	2.7937e-
05	355	0 2.7251e-108	36	4.8113	Inf	2.7634e-
05	356	0 1.3625e-108	36.1	4.8113	Inf	2.7336e-
05	357	0 6.8127e-109	36.2	NaN		2.7041e-
05	J J I	NaN	50.2	ivaiv	NaN	2./0416-

Diferenciacion centrada
[Warning: Unable to solve symbolically. Returning a numeric solution using

<a href="matlab:web(fullfile(docroot,

^{&#}x27;symbolic/vpasolve.html'))">vpasolve.]

```
[ > In < a
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/solve', 'C:\Program
Files\Polyspace\R2020a\toolbox\symbolic\symbolic\@sym\solve.m', 304)"
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opentoline('C:\Program
Files\Polyspace\R2020a\toolbox\symbolic\symbolic\@sym\solve.m',304,0)">li
ne 304 < /a > )
 In <a
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weight:bold">fdiff/diff centrada</a> (<a href="matlab:</pre>
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 In <a
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opentoline('C:\Users\ismae\OneDrive\Documentos\MATLAB\Met.
Numericos\Grupal\Diferenciacion Numerica\fdiff.m',55,0)">line 55</a>)]
   <strong>f(hi)</strong>
                           <strong>Ea</strong>
<strong>Er</strong>
                          <strong>Rt</strong>
<strong>Derivada</strong>
   <strong> </strong>
                       <strong>____</strong>
<strong>____</strong>
                  0.6
                             0.061083
                                             1.2859
   1
              0.1
                                                       21.803
4.7502
             0.05
                    0.7
                            0.0030988
                                          0.064449
   2
                                                       15.129
4.8082
                         0.00018491
   3
           0.025
                    0.8
                                          0.0038434
                                                       10.934
4.8111
                  0.9 1.1427e-05
                                          0.00023751
   4
           0.0125
                                                       8.1528
4.8112
   5
         0.00625
                  1 7.122e-07
                                          1.4803e-05
                                                       6.2314
4.8113
                  1.1 4.4482e-08
   6
         0.003125
                                          9.2453e-07
                                                       4.8605
4.8113
   7
        0.0015625
                     1.2
                           2.7796e-09
                                          5.7773e-08
                                                       3.8564
4.8113
```

Elapsed time is 89.099731 seconds.

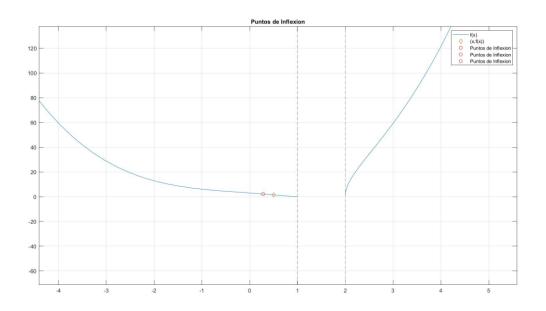
Ea =

```
Er =
    5.7773e-08

Rt =
    3.8564

F =
    4.8113

disp('Aqui va la fig 3')
Aqui va la fig 3
```



diary off