

PP3 Report

Equation A:

Bisection Method:

Root 1:

```
atexnerhande@laptop: /code % cd /code; atexnerhande; Downloads;
Please enter value of a: 0
Please enter value of b: 1
```

n	a	b	c	f(a)	f(b)	f(c)	error
0	0.0000	1.0000	0.5000	-5.0000	3.0000	1.1750	
1	0.0000	0.5000	0.2500	-5.0000	1.1750	-1.2750	1.0000
2	0.2500	0.5000	0.3750	-1.2750	1.1750	0.0977	0.3333
3	0.2500	0.3750	0.3125	-1.2750	0.0977	-0.5503	0.2000
4	0.3125	0.3750	0.3438	-0.5503	0.0977	-0.2169	0.0909
5	0.3438	0.3750	0.3594	-0.2169	0.0977	-0.0573	0.0435
6	0.3594	0.3750	0.3672	-0.0573	0.0977	0.0208	0.0213
7	0.3594	0.3672	0.3633	-0.0573	0.0208	-0.0181	0.0108
8	0.3633	0.3672	0.3652	-0.0181	0.0208	0.0014	0.0053

The root is 0.365234375

Root 2:

Please enter value of a: 1.5

Please enter value of b: 2.5

n	a	b	c	f(a)	f(b)	f(c)	error
0	1.5000	2.5000	2.0000	1.9750	-2.6250	-0.4000	
1	1.5000	2.0000	1.7500	1.9750	-0.4000	0.8625	0.1429
2	1.7500	2.0000	1.8750	0.8625	-0.4000	0.2383	0.0667
3	1.8750	2.0000	1.9375	0.2383	-0.4000	-0.0806	0.0323
4	1.8750	1.9375	1.9063	0.2383	-0.0806	0.0791	0.0164
5	1.9063	1.9375	1.9219	0.0791	-0.0806	-0.0007	0.0081

The root is 1.921875

Root 3:

Please enter value of a: 3

Please enter value of b: 4

n	a	b	c	f(a)	f(b)	f(c)	error
0	3.0000	4.0000	3.5000	-3.2000	6.6000	-0.6250	
1	3.5000	4.0000	3.7500	-0.6250	6.6000	2.3125	0.0667
2	3.5000	3.7500	3.6250	-0.6250	2.3125	0.6867	0.0345
3	3.5000	3.6250	3.5625	-0.6250	0.6867	-0.0069	0.0175
4	3.5625	3.6250	3.5938	-0.0069	0.6867	0.3303	0.0087

The root is 3.59375

Newton Raphson:

Root 1:

```
Enter the value of x: 0.5
n      xi      f(xi)    f(xi+1)    xi+1    error
0      0.5000   1.1750   7.5000   0.3433   0.4563
1      0.3433  -0.2212  10.3733   0.3647   0.0585
2      0.3647  -0.0044   9.9648   0.3651   0.0012
Root is 0.3650980600532485
```

Root 2:

```
Enter the value of x: 2
n      xi      f(xi)    f(xi+1)    xi+1    error
0      2.0000  -0.4000  -5.1000   1.9216   0.0408
1      1.9216   0.0009  -5.1101   1.9217   0.0001
Root is 1.921740932764785
```

Root 3:

```
Enter the value of x: 4
n      xi      f(xi)    f(xi+1)    xi+1    error
0      4.0000   6.6000  20.1000   3.6716   0.0894
1      3.6716   1.2554  12.6693   3.5726   0.0277
2      3.5726   0.0995  10.6811   3.5632   0.0026
Root is 3.563241095182271
```

Secant Method:

Root 1:

```
Enter the value of x0: 0
Enter the value of x1: 1
n      xi-1     xi      f(xi-1)    f(xi)    xi+1      f(xi+1)    error
0      0.0000   1.0000  -5.0000   3.0000   0.6250   1.9805   0.6000
1      1.0000   0.6250   3.0000   1.9805  -0.1034  -6.9585   7.0417
2      0.6250  -0.1034   1.9805  -6.9585   0.4636   0.8904   1.2231
3      -0.1034   0.4636  -6.9585   0.8904   0.3993   0.3293   0.1611
4      0.4636   0.3993   0.8904   0.3293   0.3615  -0.0356   0.1044
5      0.3993   0.3615   0.3293  -0.0356   0.3652   0.0012   0.0101
6      0.3615   0.3652  -0.0356   0.0012   0.3651   0.0000   0.0003
Root is 0.3652174241358371
```

//Weird pattern of secant where the error goes up after first iteration, then it goes down

Root 2:

```
Enter the value of x0: 1.5
Enter the value of x1: 2.5
n      xi-1      xi      f(xi-1)  f(xi)  xi+1      f(xi+1)  error
0      1.5000    2.5000    1.9750  -2.6250  1.9293  -0.0389  0.2958
1      2.5000    1.9293    -2.6250  -0.0389  1.9208  0.0050  0.0045
Root is 1.929347826086956
```

Root 3:

```
Enter the value of x0: 3
Enter the value of x1: 4
n      xi-1      xi      f(xi-1)  f(xi)  xi+1      f(xi+1)  error
0      3.0000    4.0000    -3.2000  6.6000  3.3265  -1.9689  0.2025
1      4.0000    3.3265    6.6000  -1.9689  3.4813  -0.7959  0.0444
2      3.3265    3.4813    -1.9689  -0.7959  3.5863  0.2479  0.0293
3      3.4813    3.5863    -0.7959  0.2479  3.5613  -0.0191  0.0070
Root is 3.586275384711736
```

False Position:

Root 1:

```
Please enter value of a: 0
Please enter value of b: 1
n      a      b      f(a)      f(b)      c      f(c)      error
0      0.0000  1.0000  -5.0000  3.0000  0.6250  1.9805
1      0.0000  0.6250  -5.0000  1.9805  0.4477  0.7585  0.3961
2      0.0000  0.4477  -5.0000  0.7585  0.3887  0.2298  0.1517
3      0.0000  0.3887  -5.0000  0.2298  0.3716  0.0646  0.0460
4      0.0000  0.3716  -5.0000  0.0646  0.3669  0.0178  0.0129
5      0.0000  0.3669  -5.0000  0.0178  0.3656  0.0049  0.0036
The root is 0.3655871767763859
```

Root 2:

```
Please enter value of a: 1.5
Please enter value of b: 2.5
n      a      b      f(a)      f(b)      c      f(c)      error
0      1.5000  2.5000  1.9750  -2.6250  1.9293  -0.0389
1      1.5000  1.9293  1.9750  -0.0389  1.9211  0.0035  0.0043
The root is 1.921058464669567
```

Root 3:

```
Please enter value of a: 3
Please enter value of b: 4
n      a      b      f(a)      f(b)      c      f(c)      error
0      3.0000  4.0000  -3.2000  6.6000  3.3265  -1.9689
1      3.3265  4.0000  -1.9689  6.6000  3.4813  -0.7959  0.0444
2      3.4813  4.0000  -0.7959  6.6000  3.5371  -0.2671  0.0158
3      3.5371  4.0000  -0.2671  6.6000  3.5551  -0.0840  0.0051
The root is 3.5551013438441474
```

Modified Secant:

Root 1:

```
Enter the value of xi: 0.5
n      xi      f(xi)      xi+1      f(xi+1)      error
0      0.5000  1.1750  0.3415  -0.2403  0.4641
1      0.3415  -0.2403  0.3648  -0.0030  0.0639
2      0.3648  -0.0030  0.3651  0.0000  0.0008
The root is 0.36479998257357954
```

Root 2:

```
Enter the value of xi: 2
n      xi      f(xi)      xi+1      f(xi+1)      error
0      2.0000  -0.4000  1.9215  0.0011  0.0408
1      1.9215  0.0011  1.9217  0.0000  0.0001
The root is 1.9215193847119616
```

//Weird pattern of modified secant is that sometimes error is exact as newton

Root 3:

```
Enter the value of xi: 4
n      xi      f(xi)      xi+1      f(xi+1)      error
0      4.0000  6.6000  3.6736  1.2808  0.0888
1      3.6736  1.2808  3.5737  0.1117  0.0280
2      3.5737  0.1117  3.5634  0.0020  0.0029
The root is 3.5736947633068965
```

Equation B:

Bisection Method:

```
Please enter value of a: 120
Please enter value of b: 130
n      a      b      c      f(a)      f(b)      f(c)      error
0      120.0000  130.0000  125.0000  -0.5682  0.2655  -0.1340
1      125.0000  130.0000  127.5000  -0.1340  0.2655  0.0698  0.0196
2      125.0000  127.5000  126.2500  -0.1340  0.0698  -0.0311  0.0099
The root is 126.25
```

Newton Raphson:

```
Enter the value of x: 125
n      xi      f(xi)      f'(xi)      xi+1      error
0      125.0000  -0.1340  0.0832  126.6106  0.0127
1      126.6106  -0.0018  0.0810  126.6324  0.0002
Root is 126.63243212479975
```

Secant:

```
Enter the value of x0: 120
Enter the value of x1: 130
n      xi-1      xi      f(xi-1)      f(xi)      xi+1      f(xi+1)      error
0      120.0000  130.0000  -0.5682  0.2655  126.8156  0.0148  0.0251
1      130.0000  126.8156  0.2655  0.0148  126.6274  -0.0004  0.0015
Root is 126.81560392015672
```

False Position:

```
Please enter value of a: 120
Please enter value of b: 130
n      a      b      f(a)    f(b)    c      f(c)    error
0      120.0000 130.0000 -0.5682 0.2655 126.8156 0.0148
1      120.0000 126.8156 -0.5682 0.0148 126.6424 0.0008 0.0014
The root is 126.64240160719655
```

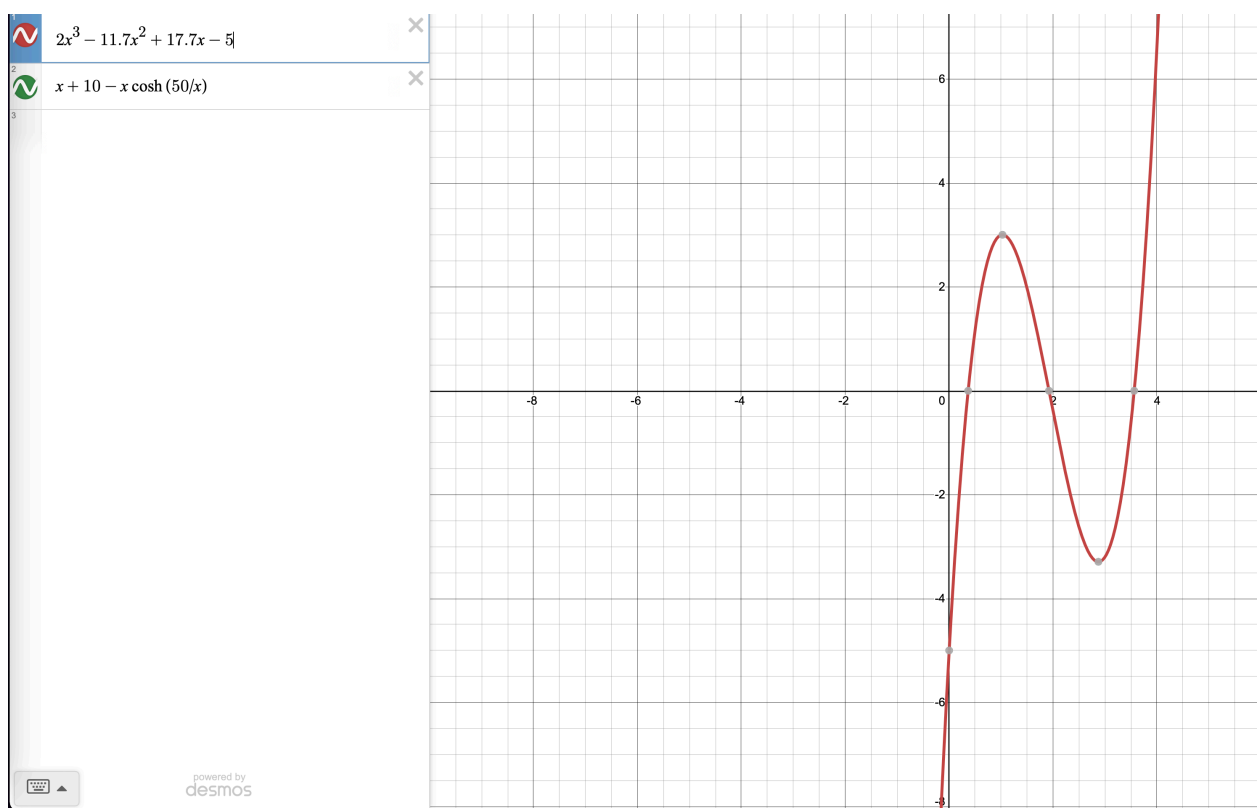
Modified Secant:

```
Enter the value of xi: 125
n      xi      f(xi)    xi+1      f(xi+1)    error
0      125.0000 -0.1340 126.6107 -0.0018 0.0127
1      126.6107 -0.0018 126.6324 -0.0000 0.0002
The root is 126.61071662949644
```

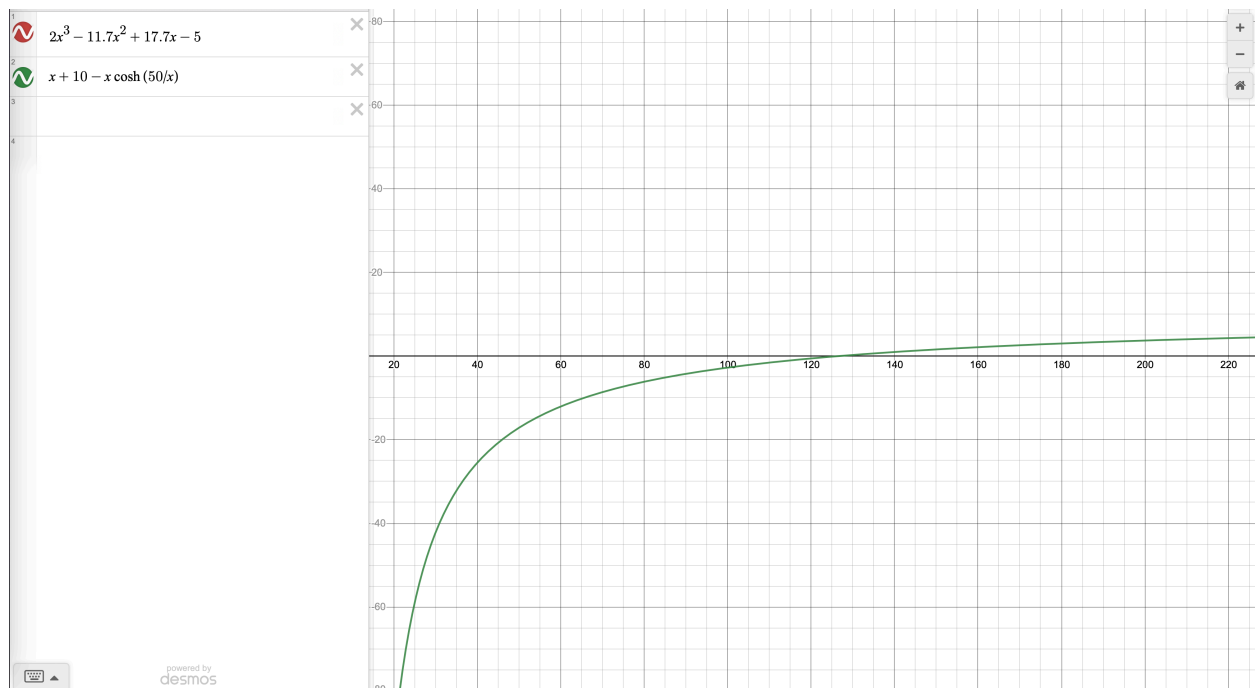
Graphs:

Of Functions:

Function A:

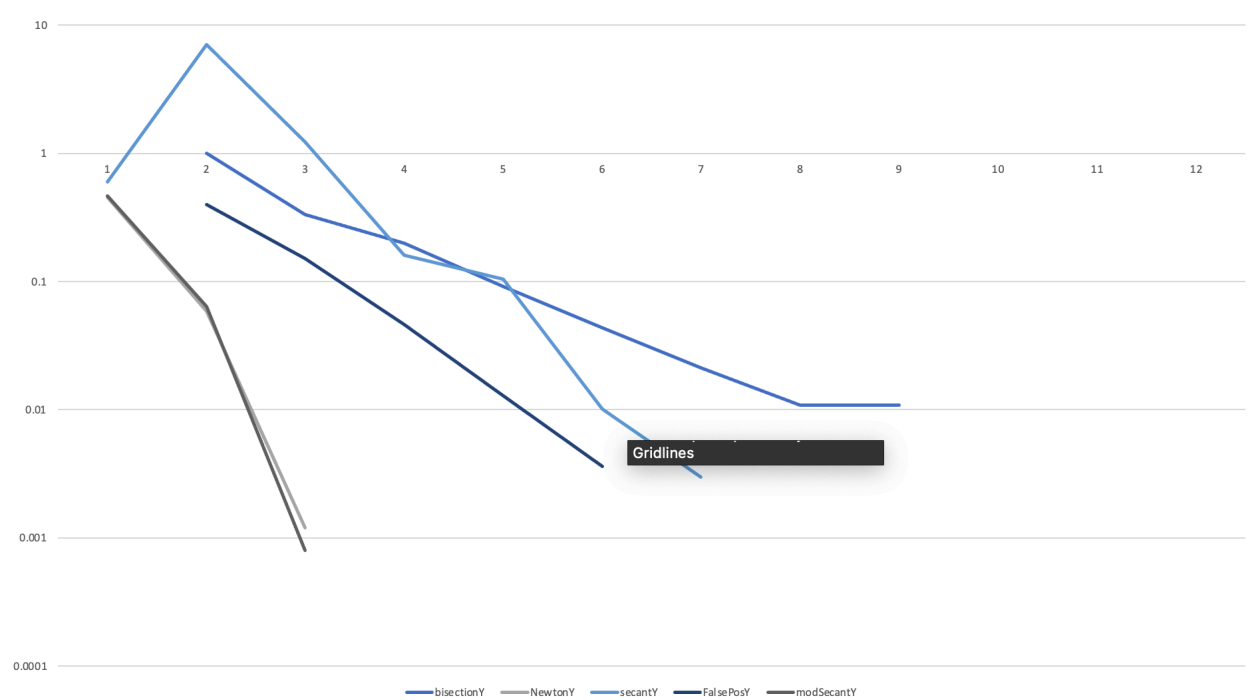


Function B:

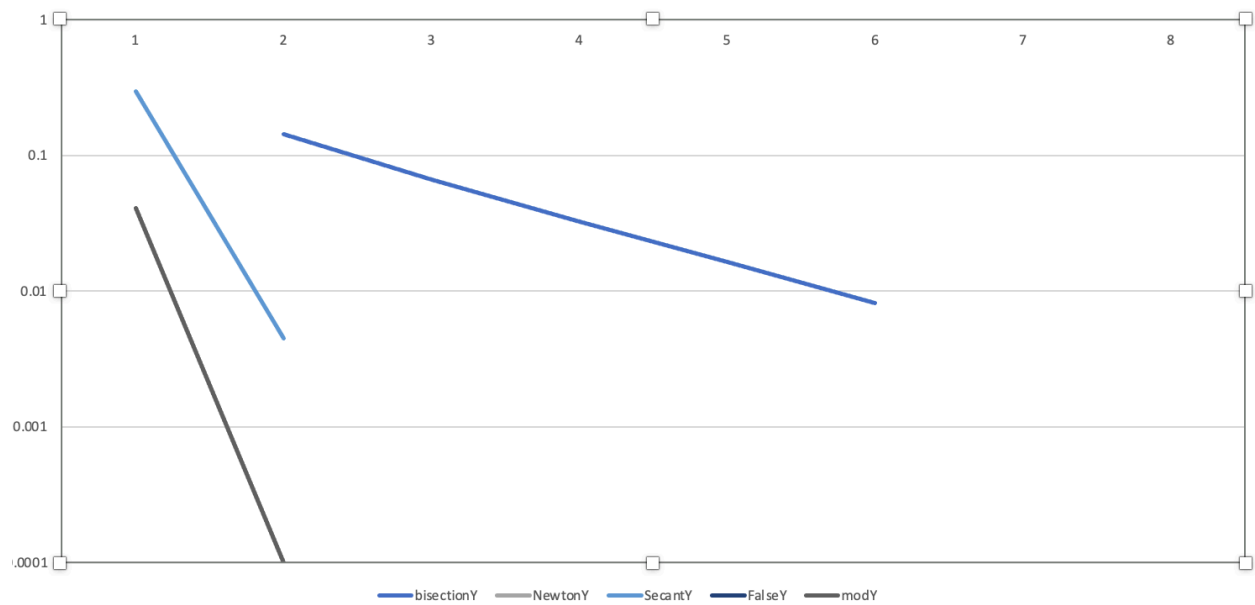


Of Errors:

Root 1 FuncA:

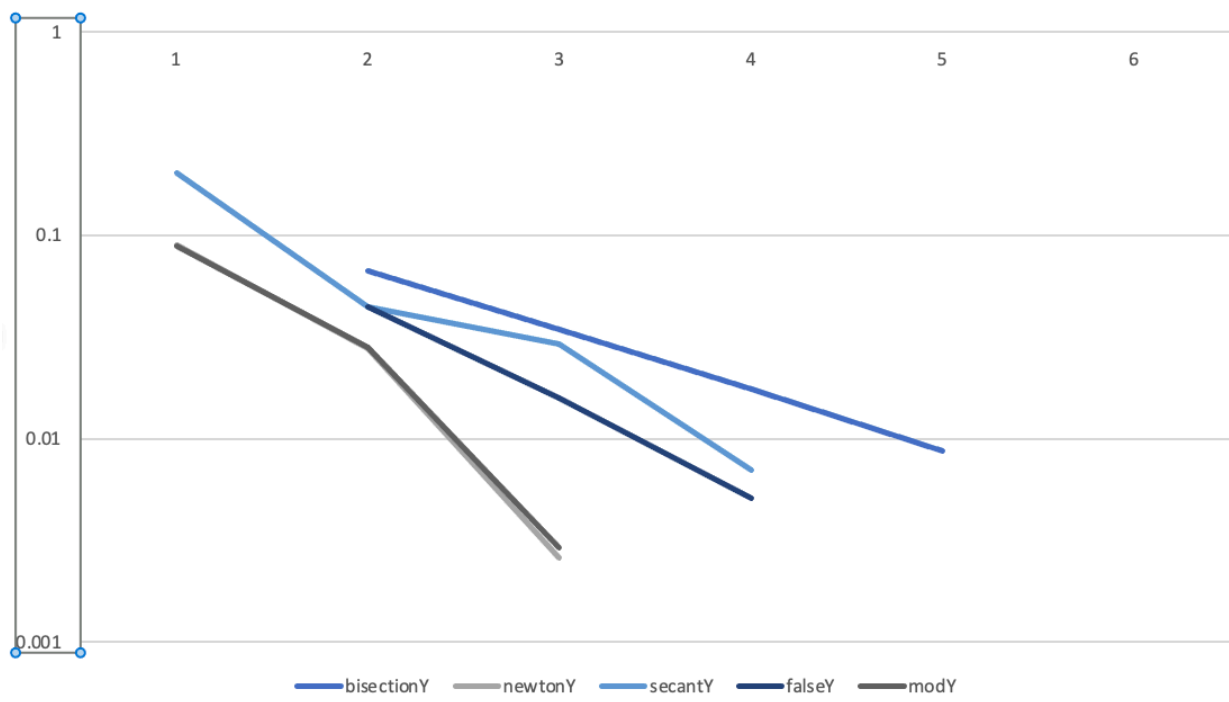


Root 2 FuncA:

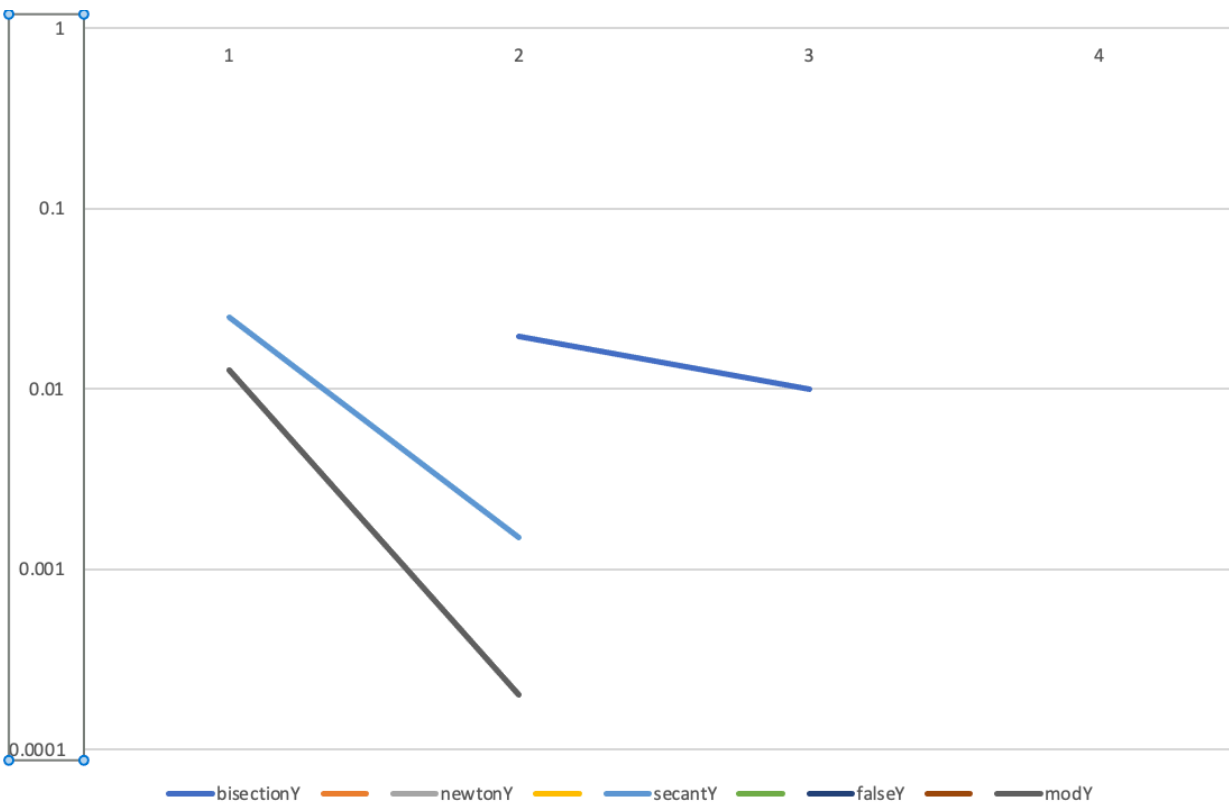


//newton and modified secant overlap

Root 3 FuncA:



FuncB:



//newton and modified secant overlap