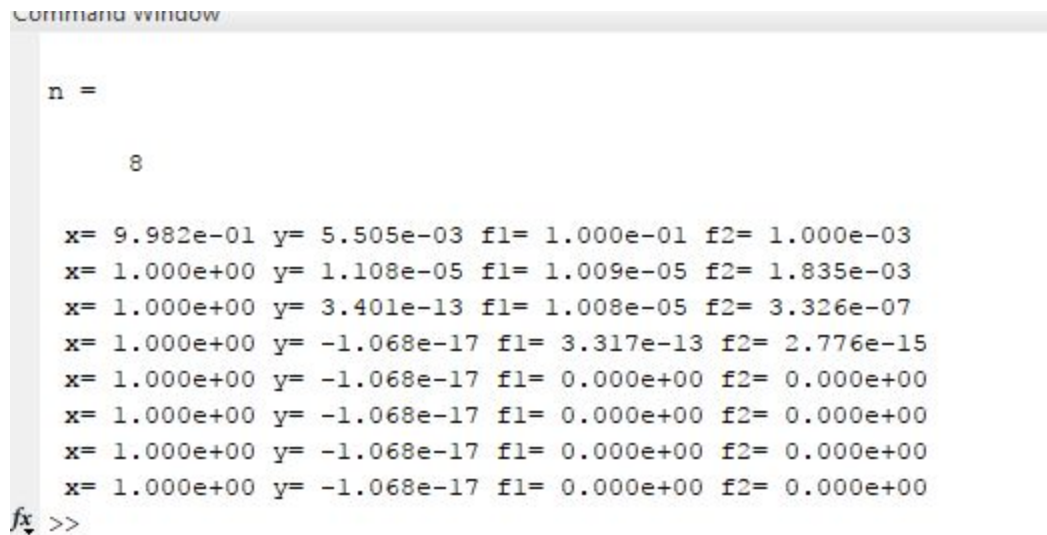


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Assignment 04
CS-3200
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Assignment 04 Report

In my matlab files, those are called programs are my source code. And the readme notes are in the matlab file too. I wrote those readme files as comments.

Question 1:



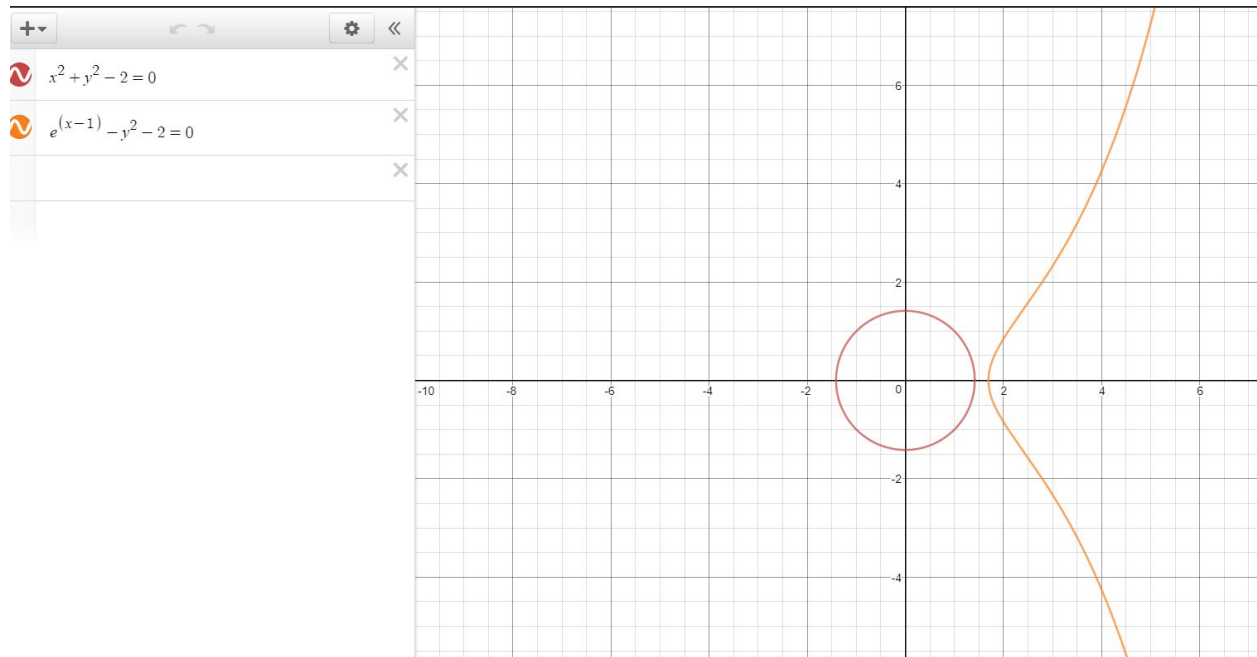
A screenshot of the MATLAB Command Window. The title bar says 'Command window'. The prompt 'n =' is followed by the value '8'. Below this, there is a table of iteration results with 8 rows. Each row contains four values: x, y, f1, and f2, separated by spaces. The values are in scientific notation. The first row shows x=9.982e-01, y=5.505e-03, f1=1.000e-01, f2=1.000e-03. The second row shows x=1.000e+00, y=1.108e-05, f1=1.009e-05, f2=1.835e-03. The third row shows x=1.000e+00, y=3.401e-13, f1=1.008e-05, f2=3.326e-07. The fourth row shows x=1.000e+00, y=-1.068e-17, f1=3.317e-13, f2=2.776e-15. The fifth row shows x=1.000e+00, y=-1.068e-17, f1=0.000e+00, f2=0.000e+00. The sixth, seventh, and eighth rows all show x=1.000e+00, y=-1.068e-17, f1=0.000e+00, f2=0.000e+00. At the bottom left, there is a cursor icon and the prompt '>>'.

```
n =  
  
      8  
  
x= 9.982e-01 y= 5.505e-03 f1= 1.000e-01 f2= 1.000e-03  
x= 1.000e+00 y= 1.108e-05 f1= 1.009e-05 f2= 1.835e-03  
x= 1.000e+00 y= 3.401e-13 f1= 1.008e-05 f2= 3.326e-07  
x= 1.000e+00 y= -1.068e-17 f1= 3.317e-13 f2= 2.776e-15  
x= 1.000e+00 y= -1.068e-17 f1= 0.000e+00 f2= 0.000e+00  
x= 1.000e+00 y= -1.068e-17 f1= 0.000e+00 f2= 0.000e+00  
x= 1.000e+00 y= -1.068e-17 f1= 0.000e+00 f2= 0.000e+00  
fx >>
```

I used the matlab code to run find the convergence. And I initially set the iteration to 8. However, as we can see, at 5th iteration, $x_1 = 1$, $x_2 = -1.068e-17$, both functions get to the convergence.

Question 2:

In class, the professor mentioned that it does NOT help to get to the convergence. The reason is that we can NOT find a solution for x_1 and x_2 for both of the functions in question 2.



Use the graph tool we can see that they do NOT have any related points.

Question 3:

By using matlab, I got all the x1 and x2 from 400 to 600 for the convergence. Here are the data:

Starting Point	x1	x2
400.0000	254.2211	219.3070
401.0000	254.2211	219.3070
402.0000	254.2211	219.3070
403.0000	254.2211	219.3070
404.0000	254.2211	219.3070
405.0000	254.2211	219.3070
406.0000	254.2211	219.3070
407.0000	254.2211	219.3070
408.0000	254.2211	219.3070
409.0000	254.2211	219.3070
410.0000	254.2211	219.3070
411.0000	254.2211	219.3070
412.0000	254.2211	219.3070
413.0000	254.2211	219.3070
414.0000	254.2211	219.3070
415.0000	254.2211	219.3070
416.0000	254.2211	219.3070
417.0000	254.2211	219.3070

418.0000	254.2211	219.3070
419.0000	254.2211	219.3070
420.0000	254.2211	219.3070
421.0000	254.2211	219.3070
422.0000	254.2211	219.3070
423.0000	254.2211	219.3070
424.0000	254.2211	219.3070
425.0000	254.2211	219.3070
426.0000	254.2211	219.3070
427.0000	254.2211	219.3070
428.0000	254.2211	219.3070
429.0000	254.2211	219.3070
430.0000	254.2211	219.3070
431.0000	254.2211	219.3070
432.0000	254.2211	219.3070
433.0000	254.2211	219.3070
434.0000	254.2211	219.3070
435.0000	254.2211	219.3070
436.0000	254.2211	219.3070
437.0000	254.2211	219.3070
438.0000	254.2211	219.3070
439.0000	254.2211	219.3070
440.0000	254.2211	219.3070
441.0000	254.2211	219.3070
442.0000	254.2211	219.3070
443.0000	254.2211	219.3070
444.0000	254.2211	219.3070
445.0000	254.2211	219.3070
446.0000	254.2211	219.3070
447.0000	254.2211	219.3070
448.0000	254.2211	219.3070
449.0000	254.2211	219.3070
450.0000	254.2211	219.3070
451.0000	254.2211	219.3070
452.0000	254.2211	219.3070
453.0000	254.2211	219.3070
454.0000	254.2211	219.3070
455.0000	254.2211	219.3070
456.0000	254.2211	219.3070

457.0000	254.2211	219.3070
458.0000	254.2211	219.3070
459.0000	254.2211	219.3070
460.0000	254.2211	219.3070
461.0000	254.2211	219.3070
462.0000	254.2211	219.3070
463.0000	254.2211	219.3070
464.0000	254.2211	219.3070
465.0000	254.2211	219.3070
466.0000	254.2211	219.3070
467.0000	254.2211	219.3070
468.0000	254.2211	219.3070
469.0000	254.2211	219.3070
470.0000	254.2211	219.3070
471.0000	254.2211	219.3070
472.0000	254.2211	219.3070
473.0000	254.2211	219.3070
474.0000	254.2211	219.3070
475.0000	254.2211	219.3070
476.0000	254.2211	219.3070
477.0000	254.2211	219.3070
478.0000	254.2211	219.3070
479.0000	254.2211	219.3070
480.0000	254.2211	219.3070
481.0000	254.2211	219.3070
482.0000	254.2211	219.3070
483.0000	254.2211	219.3070
484.0000	254.2211	219.3070
485.0000	254.2211	219.3070
486.0000	254.2211	219.3070
487.0000	254.2211	219.3070
488.0000	254.2211	219.3070
489.0000	740.3288	906.8259
490.0000	-193.2946	66.5649
491.0000	-193.2946	66.5649
492.0000	-193.2946	66.5649
493.0000	-193.2946	66.5649
494.0000	-193.2946	66.5649
495.0000	-193.2946	66.5649

496.0000	-193.2946	66.5649
497.0000	-193.2946	66.5649
498.0000	-193.2946	66.5649
499.0000	-193.2946	66.5649
500.0000	-193.2946	66.5649
501.0000	740.3288	906.8259
502.0000	254.2211	219.3070
503.0000	254.2211	219.3070
504.0000	254.2211	219.3070
505.0000	254.2211	219.3070
506.0000	254.2211	219.3070
507.0000	254.2211	219.3070
508.0000	254.2211	219.3070
509.0000	254.2211	219.3070
510.0000	254.2211	219.3070
511.0000	254.2211	219.3070
512.0000	254.2211	219.3070
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519.0000	254.2211	219.3070
520.0000	254.2211	219.3070
521.0000	254.2211	219.3070
522.0000	254.2211	219.3070
523.0000	254.2211	219.3070
524.0000	254.2211	219.3070
525.0000	254.2211	219.3070
526.0000	254.2211	219.3070
527.0000	254.2211	219.3070
528.0000	254.2211	219.3070
529.0000	254.2211	219.3070
530.0000	254.2211	219.3070
531.0000	254.2211	219.3070
532.0000	254.2211	219.3070
533.0000	254.2211	219.3070
534.0000	254.2211	219.3070

535.0000	254.2211	219.3070
536.0000	740.3288	906.8259
537.0000	-193.2946	66.5649
538.0000	-193.2946	66.5649
539.0000	-193.2946	66.5649
540.0000	-193.2946	66.5649
541.0000	-193.2946	66.5649
542.0000	-193.2946	66.5649
543.0000	-193.2946	66.5649
544.0000	-193.2946	66.5649
545.0000	-193.2946	66.5649
546.0000	740.3288	906.8259
547.0000	254.2211	219.3070
548.0000	254.2211	219.3070
549.0000	254.2211	219.3070
550.0000	254.2211	219.3070
551.0000	254.2211	219.3070
552.0000	254.2211	219.3070
553.0000	254.2211	219.3070
554.0000	254.2211	219.3070
555.0000	254.2211	219.3070
556.0000	254.2211	219.3070
557.0000	254.2211	219.3070
558.0000	254.2211	219.3070
559.0000	-193.2946	66.5649
560.0000	-193.2946	66.5649
561.0000	-193.2946	66.5649
562.0000	-193.2946	66.5649
563.0000	-193.2946	66.5649
564.0000	254.2211	219.3070
565.0000	254.2211	219.3070
566.0000	254.2211	219.3070
567.0000	254.2211	219.3070
568.0000	254.2211	219.3070
569.0000	254.2211	219.3070
570.0000	-193.2946	66.5649
571.0000	-193.2946	66.5649
572.0000	254.2211	219.3070
573.0000	254.2211	219.3070

574.0000	740.3288	906.8259
575.0000	-193.2946	66.5649
576.0000	254.2211	219.3070
577.0000	254.2211	219.3070
578.0000	254.2211	219.3070
579.0000	740.3288	906.8259
580.0000	740.3288	906.8259
581.0000	740.3288	906.8259
582.0000	740.3288	906.8259
583.0000	740.3288	906.8259
584.0000	740.3288	906.8259
585.0000	740.3288	906.8259
586.0000	740.3288	906.8259
587.0000	740.3288	906.8259
588.0000	740.3288	906.8259
589.0000	740.3288	906.8259
590.0000	740.3288	906.8259
591.0000	740.3288	906.8259
592.0000	740.3288	906.8259
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594.0000	740.3288	906.8259
595.0000	740.3288	906.8259
596.0000	740.3288	906.8259
597.0000	740.3288	906.8259
598.0000	740.3288	906.8259
599.0000	740.3288	906.8259
600.0000	740.3288	906.8259

So obviously, there are only three different solutions which are $x_1 = -193$, $x_2 = 66$
 $x_1 = 254$, $x_2 = 219$, and $x_1 = 740$, $x_2 = 906$.