

Numerical Analysis HW #2

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Problem 1

Part a

Problem: Solution:

Iteration	x_n	y_n
0	0.5000000000000000	0.5000000000000000
1	1.0000000000000000	0.5000000000000000
2	0.8125000000000000	0.4375000000000000
3	0.773719879518072	0.420557228915663
4	0.771848952636680	0.419645658001209
5	0.771844506371371	0.419643377620421
6	0.771844506346038	0.419643377607081
7	0.771844506346038	0.419643377607081

Problem 5

Problem: Solve the same system as in problem 4 but use Matlab's `fsolve` routine to do it. In particular, use the following code:

```
options = optimset('Display','iter');  
x0 = [0.5,0.5]  
[x,fval] = fsolve(@fccns,x0,options)
```

Solution: Running this code, with the system defined in `fccns.m`, returns the following approximation and error:

```
x = 0.771844506371479    0.419643377620486
```

```
fval = 1.0e-10 *
```

```
-0.250830467507512  
-0.146170298087611
```

Note that `fsolve` defaults to 10 decimal places of accuracy ($\text{tol} = 10^{-10}$) and so it only agrees with problem 4's answer to the 10th decimal place.