Contents

set 4, prob 1

```
clear; clc

% nonlinear equations f1 and f2
fn = @(x) ...
    [ x(1) + x(2) + x(1)*x(2) + 5   ;
      x(1)^2 + 2*x(2) - x(2)^2 - 2  ];

% jacobian of f1 and f2
J_fn = @(x) ...
    [ 1+x(2),   1+x(1)      ;
      2*x(1),   2-2*x(2)    ];
```

initial conditions

```
% first guess
xg = [4; -4];
fprintf('\n\n FIRST GUESS: xg = %g, %g \n', xg(1), xg(2));
fprintf('initial guess f norm = %g \n', norm(fn(xg)))

iter_6(xg, J_fn, fn)

% second guess
xg = [6; 0];
fprintf('\n\n SECOND GUESS: xg = %g, %g \n', xg(1), xg(2));
fprintf('initial guess f norm = %g \n', norm(fn(xg)))

iter_6(xg, J_fn, fn)

% third guess
xg = [-5; 5];
fprintf('\n\n THIRD GUESS: xg = %g, %g \n', xg(1), xg(2));
fprintf('initial guess f norm = %g \n', norm(fn(xg)))

iter_6(xg, J_fn, fn)
```

```
 FIRST GUESS: xg = 4, -4
initial guess f norm = 14.8661
```

subfunctions

```
% first 6 iterates

function iter_6(xg, J_fn, fn)
    for i = 1:6
```

```
        fprintf('\n ITER %d \n\n', i);
        fprintf('xg = \n');
        xg = xg - inv(J_fn(xg)) * fn(xg);
        disp(xg);
        fprintf('f norm = %g \n', norm(fn(xg)));

    end
end
```

```
 ITER 1

xg =
    3.1429
   -2.3143

f norm = 2.55478

 ITER 2

xg =
    3.1184
   -1.9733

f norm = 0.115997

 ITER 3

xg =
    3.1320
   -1.9680

f norm = 0.000171996

 ITER 4

xg =
    3.1320
   -1.9681

f norm = 3.32383e-10

 ITER 5

xg =
    3.1320
   -1.9681

f norm = 1.83103e-15

 ITER 6

xg =
    3.1320
   -1.9681

f norm = 9.93014e-16


 SECOND GUESS: xg = 6, 0
```

```
initial guess f norm = 35.7351

 ITER 1

xg =
    3.3659
   -1.1951

f norm = 6.34628

 ITER 2

xg =
    3.0274
   -1.9313

f norm = 0.494772

 ITER 3

xg =
    3.1340
   -1.9685

f norm = 0.010744

 ITER 4

xg =
    3.1320
   -1.9681

f norm = 4.08227e-06

 ITER 5

xg =
    3.1320
   -1.9681

f norm = 4.90765e-13

 ITER 6

xg =
    3.1320
   -1.9681

f norm = 4.44089e-16


 THIRD GUESS: xg = -5, 5
initial guess f norm = 21.5407

 ITER 1

xg =
   -2.8182
    3.2727

f norm = 4.16648
```

```
 ITER 2

xg =
   -2.1319
    2.8127

f norm = 0.408541

 ITER 3

xg =
   -2.0548
    2.7935

f norm = 0.00577135

 ITER 4

xg =
   -2.0542
    2.7944

f norm = 6.13463e-07

 ITER 5

xg =
   -2.0542
    2.7944

f norm = 1.63048e-14

 ITER 6

xg =
   -2.0542
    2.7944

f norm = 8.88178e-16
```

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