```
function main3
    clc
    n = 20;
    x = zeros(n,1);
    [xsol,numIter,omega] = gaussseidal(@example,x);
    display(xsol);
    display(numIter);
end

function[xnew,numIter,omega] = gaussseidal(example,x,maxIter,epsilon)
    if nargin < 4
        epsilon = 1e-9;
    end
    if nargin<3
        maxIter = 500;
    end
    k = 10;
    p =1;
    omega = 1;
    for numIter = 1:maxIter
        xold = x;
        xnew = feval(example,x,omega);
        dx = sqrt(dot((xold-xnew), (xold-xnew)));
        if dx < epsilon
            return;
        end
        if numIter == k
            dx1 = dx;
        end
        if numIter == k+p
            omega = 2/(1+sqrt(1-((dx/dx1)^(1/p))));
        end
        x = xnew;
    end
end

function x = example(x,omega)
    n = length(x);
    A = zeros(n);
    A(1,1) = 4; A(1,2) = -1;
    for i = 2:n-1
        A(i,i-1) = -1;
        A(i,i) = 4;
        A(i,i+1) = -1;
    end
    A(n,n-1) = -1; A(n,n) = 4;

    b = 5*ones(n,1);
    b(1) = 9;
    y = zeros(size(x));
    for i = 1:length(b)
```

```
            y(i) = omega*((b(i) - sum(A(i,:)*x) + A(i,i)*x(i))/A(i,i))
 + (1-omega)*x(i);
    end
    x = y;
end
```

```
xsol =

    2.9019
    2.6077
    2.5289
    2.5077
    2.5021
    2.5006
    2.5001
    2.5000
    2.5000
    2.5000
    2.5000
    2.5000
    2.4999
    2.4998
    2.4991
    2.4965
    2.4871
    2.4519
    2.3205
    1.8301
```

```
numIter =

    48
```

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