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h = 0.1;
x = 1:h:2;
n = length(x);
y = zeros(n,1);
y(1) = 1;
y(n) = 0.5;
diff = (0.5-1)/(n-1);
for i=2:n-1
    y(i)=y(i-1)+diff;
end
eps = 0.0001;
err = 1;
del = zeros(n,1);
while err > eps

    J = zeros(n,n);
    for i=2:n-1
        J(i,i-1) = f_m(y(i-1),y(i),y(i+1),h);
        J(i,i) = f_d(y(i-1),y(i),y(i+1),h);
        J(i,i+1) = f_p(y(i-1),y(i),y(i+1),h);
    end
    J(1,1) = 1;
    J(n,n) = 1;
    f = zeros(n,1);
    for i = 2:n-1
        f(i)=f_i(y(i-1),y(i),y(i+1),h);
        f(i)=f(i)*-1;
    end
    f(1)=0;
    f(n)=0;
    del = J\f;
    err=0;
    for i=1:n
        if(abs(del(i))>err)
            err = abs(del(i));
        end
        y(i)=y(i)+del(i);
    end

end

fprintf("Calculated Values of Y : ");
y
plot(x,y,'r');
grid on;
xlabel('X');
ylabel('Y');
legend('Calculated Y');
function y=f_i(y_i_m,y_i,y_i_p,h)
    y=(y_i_m-2*y_i+y_i_p)/(h*h)-2*y_i^3-2;
end
function y=f_m(y_i_m,y_i,y_i_p,h)
    y=1/(h*h);

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end
function y=f_p(y_i_m,y_i,y_i_p,h)
    y=1/(h*h);
end
function y=f_d(y_i_m,y_i,y_i_p,h)
    y=-2/(h*h)-6*y_i^2;
end

```

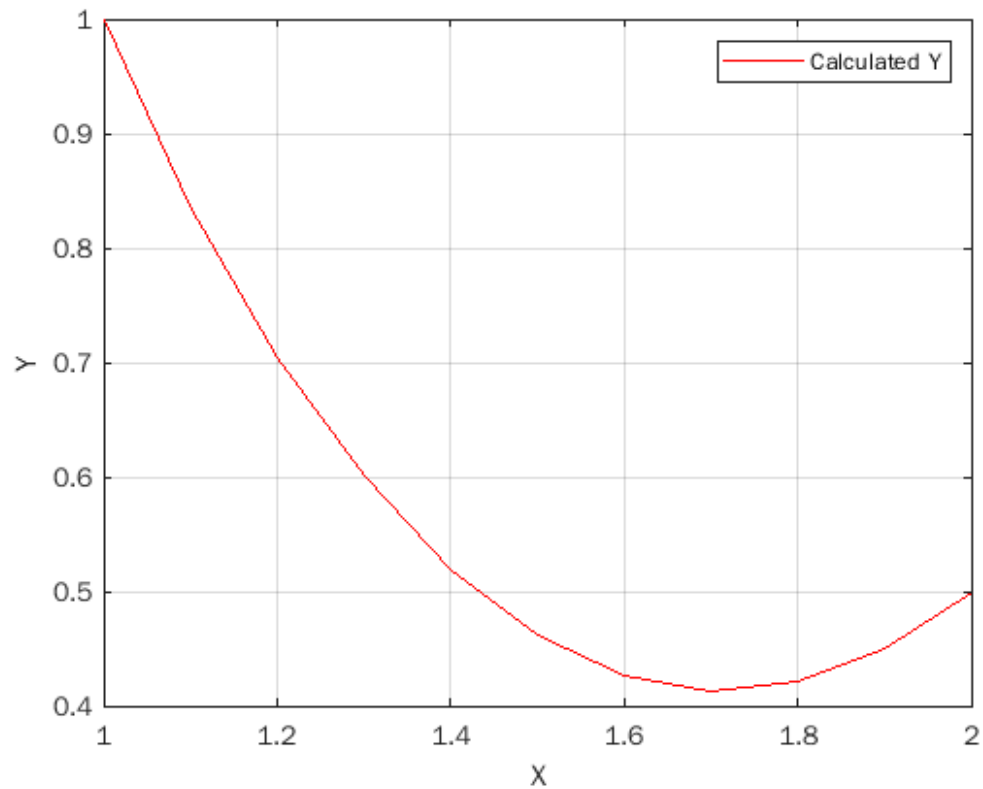
*Calculated Values of Y :*

*Y =*

```

1.0000
0.8366
0.7050
0.6003
0.5200
0.4625
0.4269
0.4129
0.4204
0.4493
0.5000

```



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