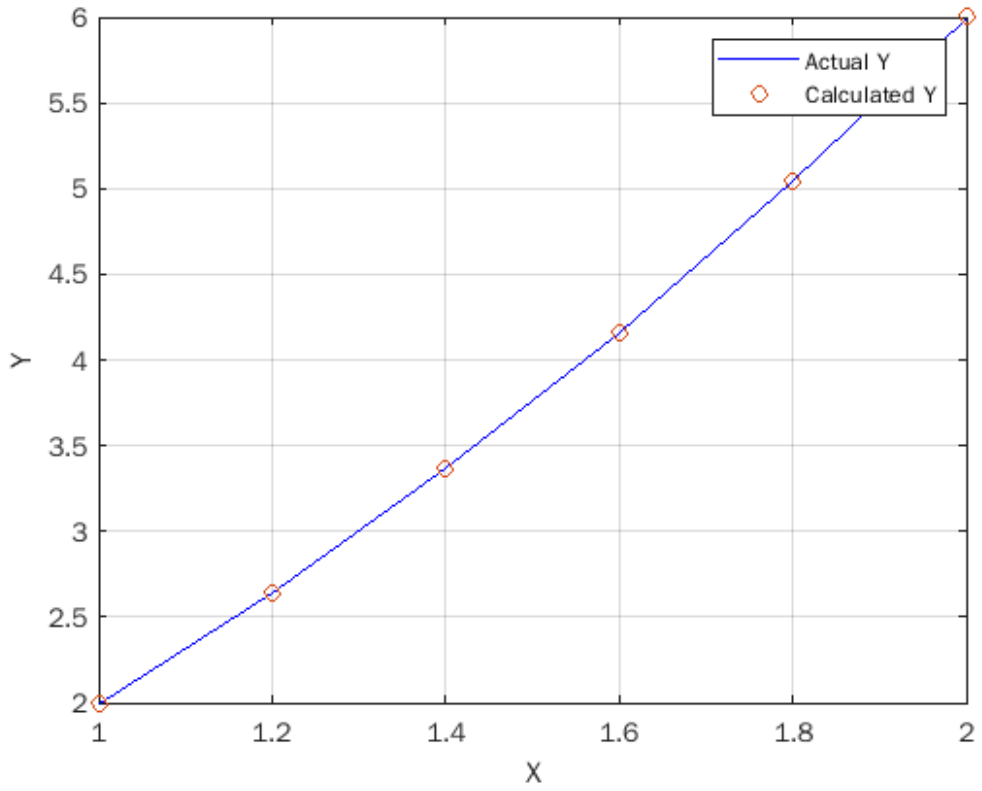
```
h = 0.2;
x = 1:h:2;
n = length(x);
y = zeros(n,1);
y(1) = 2;
y(n) = 6;
diff = (6-2)/(n-1);
for i=2:n-1
    y(i)=y(i-1)+diff;
end
y1 = zeros(n,1);
y2 = zeros(n,1);
for i=2:n-1
    y1(i) = (y(i+1)-y(i-1))/(2*h);
    y2(i) = (y(i+1)-2*y(i)+y(i-1))/(h*h);
end
eps = 0.00001;
err = 1;
while err > eps
    a = zeros(n,1);
    b = zeros(n,1);
    c = zeros(n,1);
    d = zeros(n,1);

    for i = 2:n-1
        a(i) = (y(i)/(h*h) + 1/(2*h));
        b(i) = -2*y(i)/(h*h) + y2(i);
        c(i) = (y(i)/(h*h) -1/(2*h));
        d(i) = y(i)*y2(i) + 2*x(i)^2 - 1;
    end

    d(2) = d(2)-a(2)*2;
    a(2) = 0;
    d(n-1) = d(n-1)-c(n-1)*6;
    c(n-1) = 0;
    del = zeros(n,1);

    % Thomas algorithm

    gamma = zeros(n,1);
    beta = zeros(n,1);
    gamma(2) = c(2)/b(2);
    beta(2) = d(2)/b(2);
    for i=3:n-1
        gamma(i) = (c(i))/(b(i)-a(i)*gamma(i-1));
        beta(i) = (d(i)- a(i)*beta(i-1))/(b(i)-a(i)*gamma(i-1));
    end
    del(n-1)=beta(n-1);
    err = abs(del(n-1)-y(n-1));
    y(n-1)=del(n-1);

    for i=n-2:-1:2
```

```
        del(i) = beta(i) - gamma(i)*del(i+1);
        if(abs(del(i)-y(i))>err)
            err = abs(del(i)-y(i));
        end
        y(i)=del(i);
    end
    for i=2:n-1
        y1(i) = (y(i+1)-y(i-1))/(2*h);
        y2(i) = (y(i+1)-2*y(i)+y(i-1))/(h*h);
    end
end

xmesh=linspace(1,2,n);
solinit=bvpinit(xmesh,@guess);
sol=bvp4c(@bvpfcn,@bcfcn,solinit);
plot(sol.x,sol.y(1,:),'b',x,y,'o');
grid on;
xlabel('X');
ylabel('Y');
legend('Actual Y', 'Calculated Y');

y
sol.y(1,:)

function dydx=bvpfcn(x,y)
dydx=zeros(2,1);
dydx=[y(2)
     (2*x^2-1+y(2))/y(1)];
end

function res=bcfcn(ya,yb)
res=[ya(1)-2
     yb(1)-6];
end

function g=guess(x)
g=[x^2
    0];
end
```

```
y =

    2.0000
    2.6400
    3.3600
    4.1600
    5.0400
    6.0000


ans =

    2.0000    2.6400    3.3600    4.1600    5.0400    6.0000
```



Published with MATLAB® R2021b