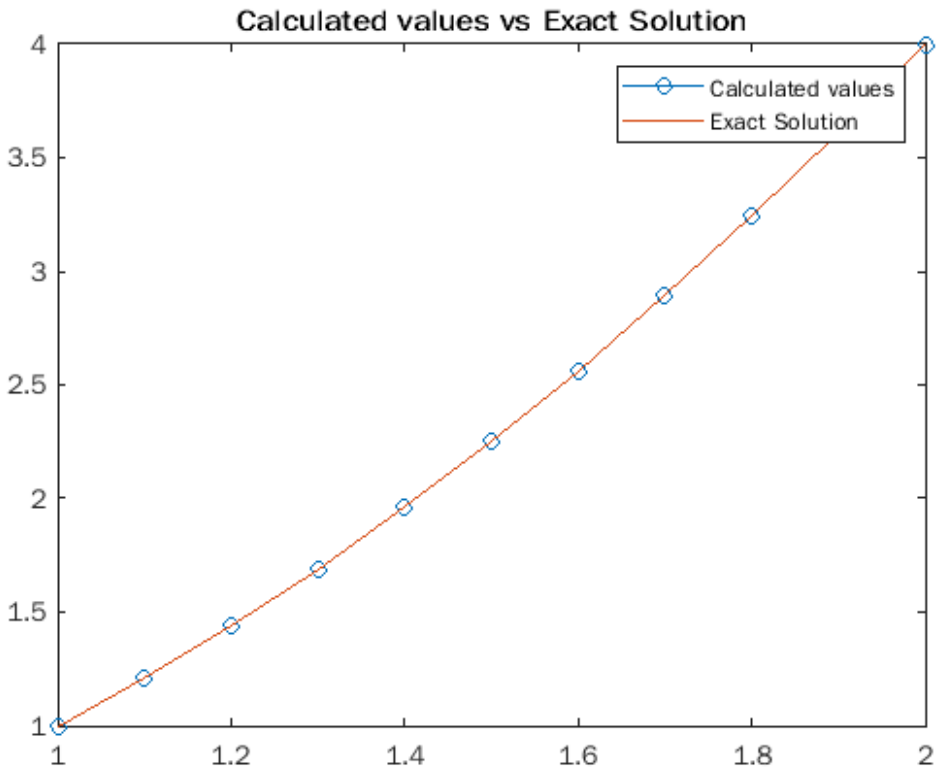
```
x0=1;xn=2;
y0=1;yn=4;
h=0.1;

n=(xn-x0)/h-1;

yi=zeros(n,1)+3;

A=zeros(n,n);
B=zeros(n,1);
for k=1:1000
    for i=1:n
        ai=value_a(yi,h,i);
        bi=value_b(yi,h,i);
        ci=value_c(yi,h,i);
        di=value_d(yi,h,i);
        B(i)=di;

        if i~=1
            A(i,i-1)=ai;
        else
            B(i)=B(i)-y0*ai;
        end

        A(i,i)=bi;

        if i~=n
            A(i,i+1)=ci;
        else
            B(i)=B(i)-ci*yn;
        end
    end

    y=thomasAlgorithm(A,B);

    yi=y;
end
xs=[x0:h:xn];
ys=[y0;yi;yn];
disp('Graph for Calculated values vs Exact Solution')


plot(xs,ys,'o-');
hold on;
plot(xs,xs.^2);
title('Calculated values vs Exact Solution');
legend('Calculated values','Exact Solution');
hold off;

function y=thomasAlgorithm(A,B)
    [r,~]=size(A);
```

```
    C=zeros(1,r);
    D=zeros(1,r);

    C(1)=A(1,2)/A(1,1);
    D(1)=B(1)/A(1,1);

    for i = 2:r
        if i~=r
            C(i)=A(i,i+1)/(A(i,i)-A(i,i-1)*C(i-1));
        end
        D(i)=(B(i)-A(i,i-1)*D(i-1))/(A(i,i)-A(i,i-1)*C(i-1));
    end
    y=zeros(r,1);
    y(r)=D(r);

    for i = r-1:-1:1
        y(i)=D(i)-C(i)*y(i+1);
    end
end

function y=value_a(yi,h,i)
   if i~=1
       ym=yi(i-1);
   else
       ym=1;
   end

   [n,~]=size(yi);

    if i~=n
        yp=yi(i+1);
    else
        yp=4;
    end
    yj=yi(i);

    y=(ym-yp)/(2*h^2)-2*yj/h^2;
end

function y=value_b(yi,h,i)
    if i~=1
       ym=yi(i-1);
   else
       ym=1;
   end

   [n,~]=size(yi);

    if i~=n
        yp=yi(i+1);
    else
        yp=4 ;
    end
    yj=yi(i);
```

```
    y=-2*ym/h^2+8*yj/h^2-2*yp/h^2;
end

function y=value_c(yi,h,i)
    if i~=1
       ym=yi(i-1);
   else
       ym=1;
   end

   [n,~]=size(yi);

    if i~=n
        yp=yi(i+1);
    else
        yp=4;
    end

    yj=yi(i);

    y=(yp-ym)/(2*h*h)-2*yj/h^2;
end


function y=value_d(yi,h,i)
    if i~=1
       ym=yi(i-1);
   else
       ym=1;
   end

   [n,~]=size(yi);

    if i~=n
        yp=yi(i+1);
    else
        yp=4;
    end
    yj=yi(i);
    y=((yp-ym)/(2*h))^2-2*yj*(ym-2*yj+yp)/h^2;
end
```

Graph for Calculated values vs Exact Solution



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