
```
% Maloth Dileep 19MA20024
```

```
n = 4; h = 1;
```

```
px = @(Mk,Mk1,h,yk,yk1,xk,xk1,x) (Mk/6)*((xk1 - x)^3/h - h*(xk1 - x)) +  
    (Mk1/6)*((x - xk)^3/h - h*(x - xk))...  
+ (yk/h)*(xk1 - x) + (yk1/h)*(x - xk);
```

```
diffpx = @(Mk,Mk1,h,yk,yk1,xk,xk1,x) (Mk/6)*((-3/h)*(xk1 - x)^2 + h) +  
    (Mk1/6)*((3/h)*(x - xk)^2 - h)...  
- (yk/h) + (yk1/h);
```

```
a = 1.5; b = 3;
```

```
X = zeros(n,1);
```

```
for i = 1:n  
X(i) = i;  
end
```

```
Y = zeros(n,1);
```

```
Y(1) = 1; Y(2) = 2;  
Y(3) = 5; Y(4) = 11;
```

```
M = zeros(n,1);  
A = zeros(n-2,n-2);  
B = zeros(n-2,1);  
U = zeros(n-2,1);
```

```
for i = 2:n-2  
A(i,i-1) = 1;  
end
```

```
for i = 1:n-2  
A(i,i) = 4;  
end
```

```
for i = 1:n-3  
A(i,i+1) = 1;  
end
```

```
for i = 1:n-2  
B(i) = (6/h^2)*((Y(i+2) - Y(i+1)) - (Y(i+1) - Y(i)));  
end  
U = ThomasAlgo(A,D);
```

```
for i = 1:n-2  
M(i+1) = U(i);  
end
```

```
k = 1;
```

```

for i = 1:n-1
if X(i)<=a && X(i+1)>a
k = i;
break;
end
end

ya = px(M(k),M(k+1),h,Y(k),Y(k+1),X(k),X(k+1),a);

for i = 1:n-1
if X(i)<=b && X(i+1)>b
k = i;
break;
end
end

yb = diffpx(M(k),M(k+1),h,Y(k),Y(k+1),X(k),X(k+1),b);
fprintf('y(%f) = %f\n',a,ya);
fprintf('y'(%f) = %f\n",b,yb);

%Thomas Algorithm
function y=ThomasAlgo(A,B)
    n = size(A,1);
    A(1,2) = A(1,2)/A(1,1);
    for i = 2:n-1
        A(i,i+1) = A(i,i+1)/(A(i,i) - A(i,i-1)*A(i-1,i));
    end

    B(1) = B(1)/A(1,1);
    for i = 2:n
        B(i) = (B(i) - A(i,i-1)*B(i-1))/(A(i,i) - A(i,i-1)*A(i-1,i));
    end

    y = zeros(n,1);
    y(n) = B(n);
    for i = n-1:-1:1
        y(i) = B(i) - A(i,i+1)*y(i+1);
    end
end

y(1.500000) = 1.500000
y'(3.000000) = 6.000000

```

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