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n = 4;
h = 1;
a = zeros(n, 1);
b = zeros(n, 1);
c = zeros(n, 1);
d = zeros(n, 1);

x = [1;2;3;4];
y = [1;5;11;8];

for i=2:n-1
    a(i) = h/6;
    b(i) = 2*h/3;
    c(i) = h/6;
    d(i) = -2*y(i)/h + y(i-1)/h + y(i+1)/h;
end

m = 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
m(n-1)=beta(n-1);
for i=n-2:-1:2
    m(i) = beta(i) - gamma(i)*m(i+1);
end
m

ans1 = f(x, m, 1, 1, y, 1.5);
fprintf("Y(1.5) = %0.5f\n", ans1);
ans2 = f_d(x, m, 1, 1, y, 2);
fprintf("Y'(2) = %0.5f\n", ans2);

xx = 1:h/10:4;
N = length(xx);
y_calc = zeros(N, 1);
for i = 1:N
    if xx(i)<2
        y_calc(i) = f(x,m,1,h,y,xx(i));
    elseif xx(i)<3
        y_calc(i) = f(x,m,2,h,y,xx(i));
    elseif xx(i)<=4
        y_calc(i) = f(x,m,3,h,y,xx(i));
    end
end
yy = spline(x,y,xx);
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plot(x, y, 'o', xx, yy, 'r', xx, y_calc, 'b');
grid on;
xlabel('X');
ylabel('Y');
c = legend('Given', 'Spline(MATLAB)', 'Calculated');
c.Location = 'northwest';

function y = f(x,m,k,h,y,X)
    y = (m(k)/6)*((x(k+1)-X)^3/h-h*(x(k+1)-X))+y(k)*(x(k+1)-X)/h+(m(k+1)/6)*((X-x(k))^3/h-h*(X-x(k)))+y(k+1)*(X-x(k))/h;
end
function y = f_d(x,m,k,h,y,X)
    y = (m(k)/6)*(-3*(x(k+1)-X)^2/h+h)-y(k)/h+(m(k+1)/6)*(3*(X-x(k))^2/h-h)+y(k+1)/h;
end

```

$m =$

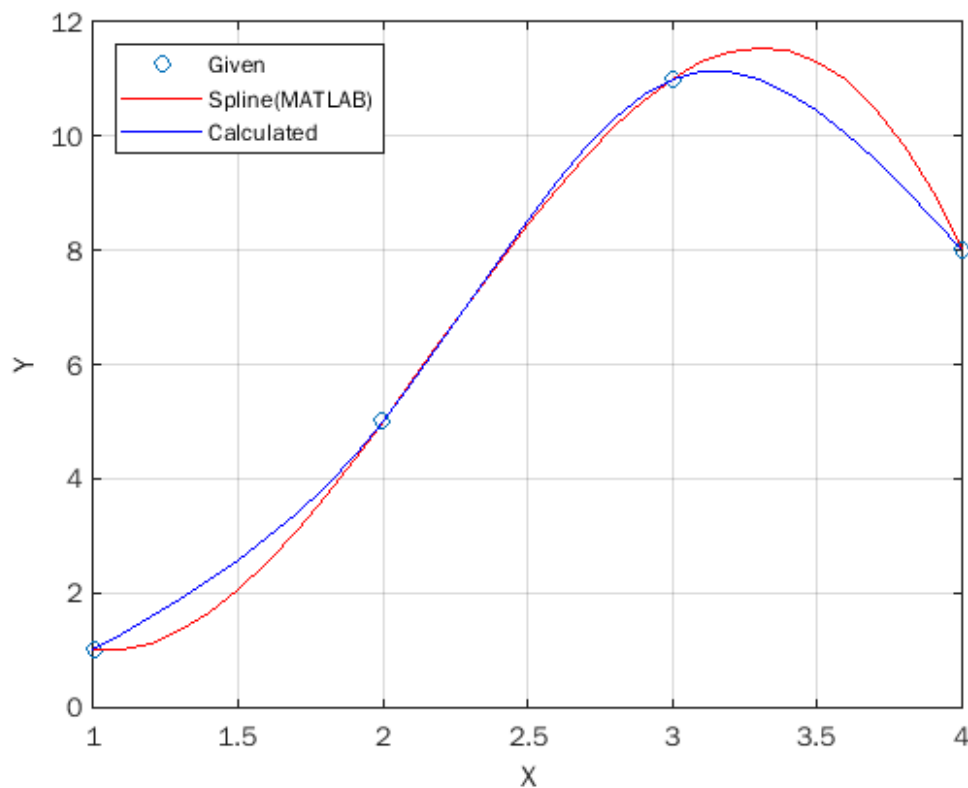
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    0
    6.8000
   -15.2000
    0

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$Y(1.5) = 2.57500$

$Y'(2) = 6.26667$



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