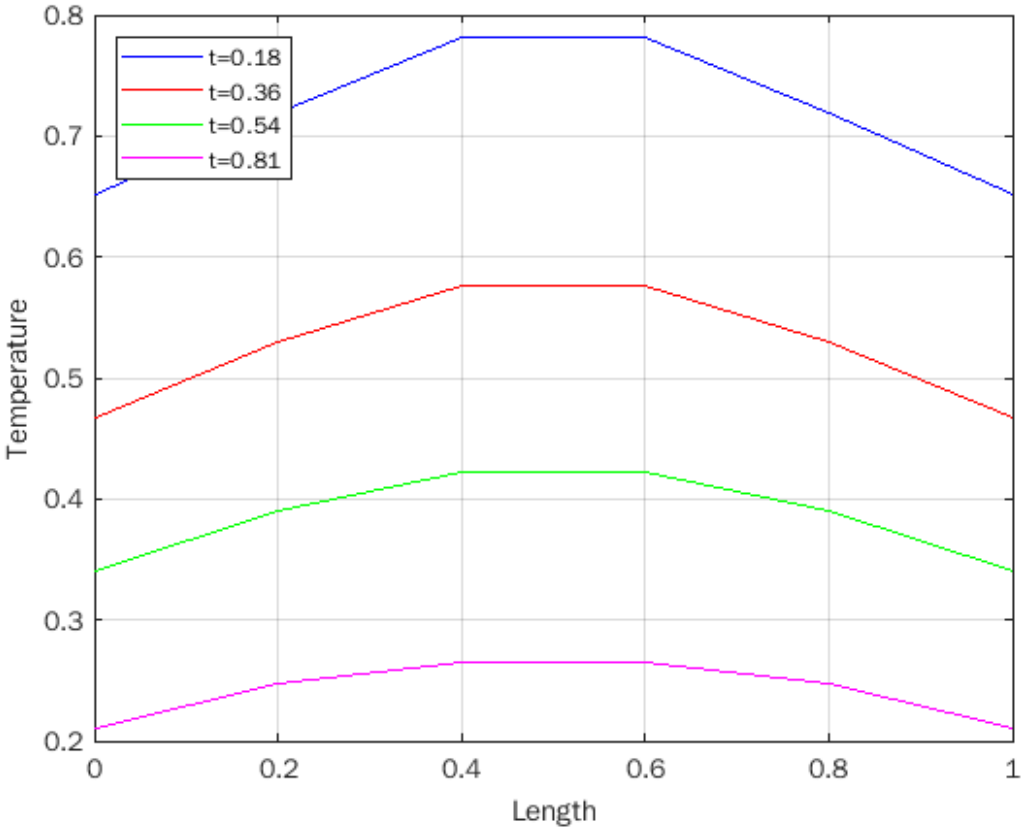
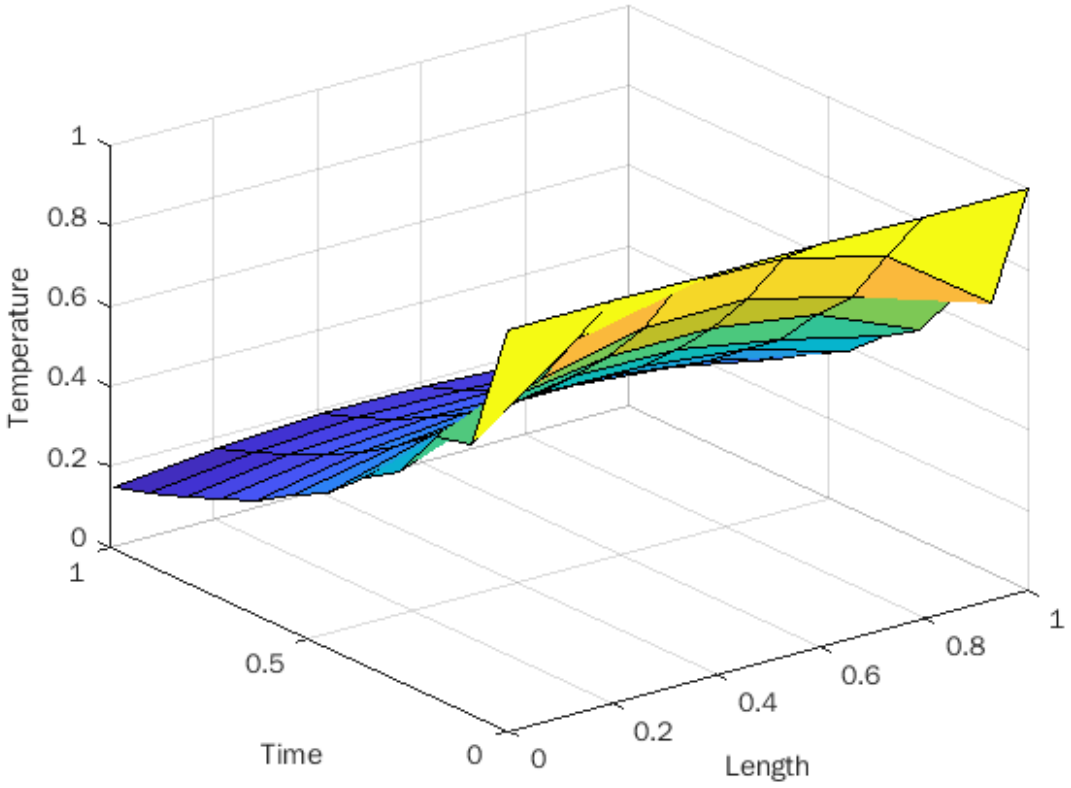
```
h = 0.2;
k = 0.09;
l = k/(h*h);
x = 0:h:1;
t = 0:k:1;
n = length(x);
m = length(t);
u = zeros(n,m);
for i=1:n
    u(i,1) = 1;
end
for j=1:m-1
    a = zeros(n,1);
    b = zeros(n,1);
    c = zeros(n,1);
    d = zeros(n,1);
    % Finding the entries of the tridiagonal matrix
    for i = 2:n-1
        a(i) = -l/2;
        b(i) = 1+l;
        c(i) = -l/2;
        d(i) = (l/2)*u(i-1,j)+(1-l)*u(i,j)+(l/2)*u(i+1,j);
    end

    b(1) = 1+l-2*(-l/2)*h;
    c(1) = -l;
    d(1) = (l/2)*(u(2,j)-2*h*u(1,j))+(1-l)*u(1,j)+(l/2)*u(2,j);
    a(n) = -l;
    b(n) = 1+l-2*(-l/2)*h;
    d(n) = (l/2)*u(n-1,j)+(1-l)*u(n,j)+(l/2)*(u(n-1,j)-2*h*u(n,j));

    % Thomas algorithm
    gamma = zeros(n,1);
    beta = zeros(n,1);
    gamma(1) = c(1)/b(1);
    beta(1) = d(1)/b(1);
    a(1) = 0;
    c(n) = 0;
    for i=2:n
        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
    u(n,j+1)=beta(n);
    for i=n-1:-1:1
        u(i,j+1) = beta(i) - gamma(i)*u(i+1,j+1);
    end
end
figure(1);
plot(x,u(:,3),'b',x,u(:,5),'r',x,u(:,7),'g',x,u(:,10),'m');
grid on;
xlabel('Length');
ylabel('Temperature')
```

```
z = legend('t=0.18','t=0.36','t=0.54','t=0.81');
z.Location = "northwest";
figure(2);
surf(x,t',u');
xlabel('Length');
ylabel('Time');
zlabel('Temperature');
```


t=0.18
t=0.36
t=0.54
t=0.81
Temperature
Length
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
0.2
0.4
0.6
0.8
1



Published with MATLAB® R2021b