

Cleaning workspace

```
clear;  
clc;
```

Loading data:

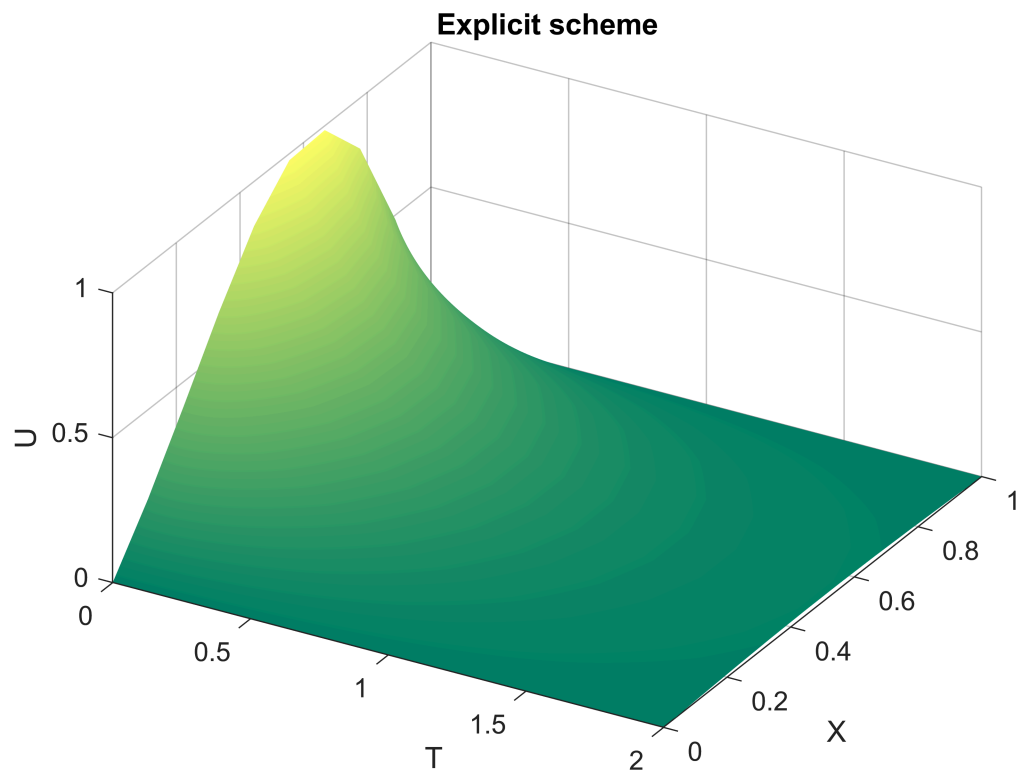
```
if isfile('data.mat')  
    load('data.mat');  
end
```

Problem:

```
T_0 = 0; % Time begin  
T_1 = 2; % Time end  
  
a = 0; % x left boundary  
b = 1; % x right boundary  
  
syms x;  
syms t;  
  
u_a = 0; % Temperature at left boundary  
u_b = 0; % Temperature at right boundary  
  
u_0 = sin(x * (x + 1) * pi/2); % Temperature at t = T_0  
  
D = 0.2; %  $L[u(x, t)] = D * d^2u/dx^2$ ;  $D = \lambda / (\rho * c)$   
  
N = 10; % Amount of points in [a; b] segment  
M = 500; % Amount of points in [0; T] segment
```

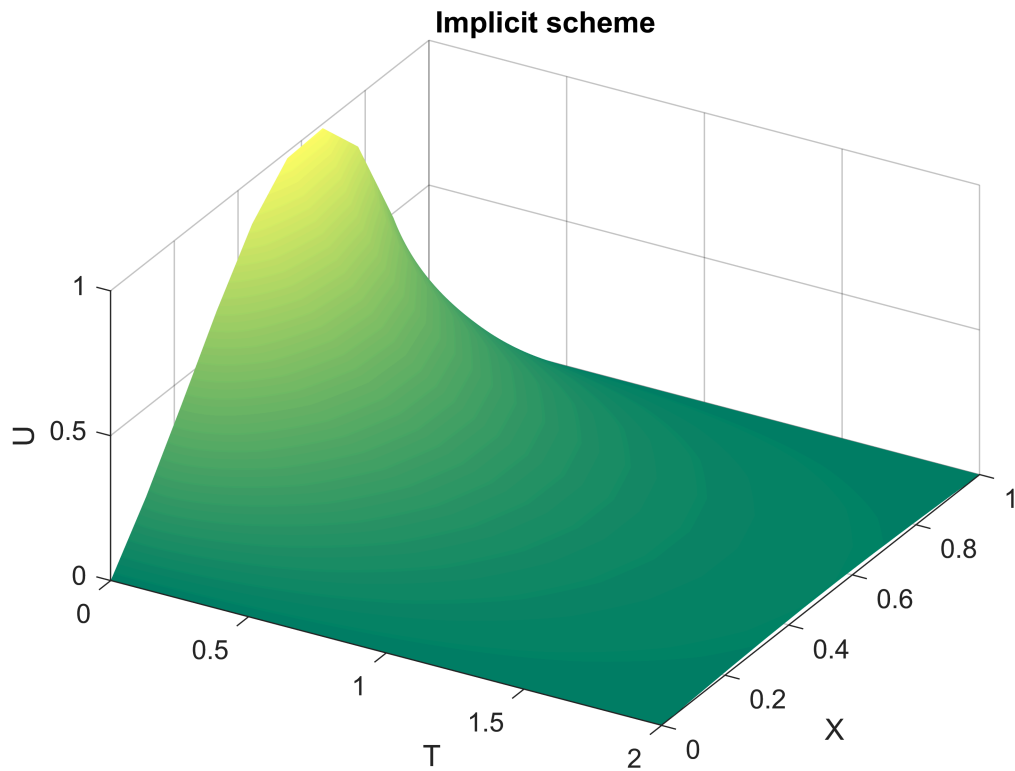
Explicit method:

```
tableExp = ExplicitMethod(T_0, T_1, a, b, u_a, u_b, u_0, N, M, D);  
display_solution(tableExp, 'Explicit scheme', T_0, T_1, a, b);
```



Implicit method:

```
tableImp = ImplicitMethod(T_0, T_1, a, b, u_a, u_b, u_0, N, M, D);
display_solution(tableImp, 'Implicit scheme', T_0, T_1, a, b);
```



Saving data:

```
save('data.mat');
```

Functions:

```
function display_solution(table, name, T_0, T_1, a, b)
    figure;
    x = linspace(a, b, size(table, 1));
    t = linspace(T_0, T_1, size(table, 2));
    surf(t, x, table);
    title(name);
    xlabel('T');
    ylabel('X');
    zlabel('U');
    colormap summer;
    shading interp;
    view([30 45]);
end
```