Equation to solve:

$$\frac{\partial U(x,t)}{\partial t} = D\frac{\partial^2 U(x,t)}{\partial x^2} \qquad x \in [0,1] \qquad t_{\max} = 0.5, D = 1$$
$$t \in [0, t_{\max}]$$

Initial condition:

$$U(x,0) = \sin(\pi x)$$

Boundary condition's:

$$U(0,t) = 0, \quad U(1,t) = 0$$

Analitycal solution:

$$U(x,t) = \exp(-\pi^2 Dt)\sin(\pi x)$$

Solution Example:

Laasonen + Gauss Seidel