We consider the problem of finding, from the final data \( u(x, T) = \varphi(x) \), the temperature function \( u(x, t), \ x \in (0, \pi), \ t \in [0, T] \) satisfies the following nonlinear system

\[
\begin{align*}
    u_t - u_{xx} & = f(x, t, u(x, t)), & (x, t) \in (0, \pi) \times (0, T) \\
    u(0, t) & = u(\pi, t) = 0, & t \in (0, T).
\end{align*}
\]

The nonlinear problem is severely ill-posed. We shall improve the quasi-boundary value method to regularize the problem and to get some error estimates. The approximation solution is calculated by the contraction principle. A numerical experiment is given.