

1.  $\because u(x,t)=1 \Rightarrow u(0,t)=u(1,t)=1 \neq 0$

$u(x,t)$  is not satisfy Dirchlet boundary condition

$$\Rightarrow \int_0^1 u^2 dx \leq C_p^2 \int_0^1 (u_x)^2 dx \text{ is not hold}$$

$\therefore (2)$  does not hold.