

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

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

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

$\therefore (2)$  does not hold.