Problem 15

Find the solution of the initial value problem

\[ u'' + u = F(t), \quad u(0) = 0, \quad u'(0) = 0, \]

where

\[ F(t) = \begin{cases} 
F_0 t, & 0 \leq t \leq \pi, \\
F_0(2\pi - t), & \pi < t \leq 2\pi, \\
0, & 2\pi < t. 
\end{cases} \]

*Hint:* Treat each time interval separately, and match the solutions in the different intervals by requiring \( u \) and \( u' \) to be continuous functions of \( t \).