MATH 6590, Homework 5

1. (5 points) Write the weak formulation for the following problem:

\[
\begin{aligned}
    u^{(4)} &= f & \text{in } \Omega = (0, 1) \\
    u(0) &= 0, & u''(0) &= 2 \\
    u'(1) &= 0, & u'''(1) &= -1
\end{aligned}
\]

2. (15 points) Textbook 10.x.25. \(|v|_{H^1(\Omega)}\) in part (c) should be \(|\tilde{v}|_{H^1(\Omega)}\). You can use all results proved in class.

(Hint: It might be easier to use a discrete norm equivalent to the \(L^2\) norm, like the one defined in problem 1 of homework 4. You need to construct a correct equivalent norm for \(V_h + \tilde{V}_h\).)