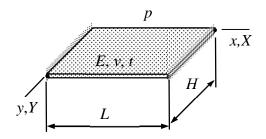
Assignment 5 (4p)

The rectangle plate shown, of thickness, length and width t, L, and H, is simply supported on edges where $x \in \{0, L\}$ and free on the remaining edges where $y \in \{0, H\}$, and loaded by pressure p acting on the upper surface. Young's modulus E and Poisson's ratio v are constants. Determine the parameter a_0 of the approximation $w(x, y) = a_0(x/L)(1-x/L)$. Use the principle of virtual work in form $\delta W = 0 \ \forall \delta a_0 \in \mathbb{R}$ and



$$\delta W = -\int_{\Omega} \left\{ \begin{aligned} \frac{\partial^2 \delta w}{\partial x^2} \\ \frac{\partial^2 \delta w}{\partial y^2} \\ 2 \frac{\partial^2 \delta w}{\partial x \partial y} \end{aligned} \right\} D \begin{bmatrix} 1 & v & 0 \\ v & 1 & 0 \\ 0 & 0 & \frac{1}{2}(1-v) \end{bmatrix} \begin{cases} \frac{\partial^2 w}{\partial x^2} \\ \frac{\partial^2 w}{\partial y^2} \\ 2 \frac{\partial^2 w}{\partial x \partial y} \end{cases} dA + \int_{\Omega} \delta w b_n dA \,.$$