Adam Mażydło, Temat: 4.3 - Odkształcenie sprężyste.

$$-\frac{d}{dx}\left(E(x)\frac{du(x)}{dx}\right)=0$$

$$\frac{du(0)}{du} + u(0) = 10$$

$$u(2) = 3$$

$$E(x) = \begin{cases} 2, & x \in [0,1] \\ 6, & x \in (1,2] \end{cases}$$

$$v \in V = \{ f : f \in H^1(\Omega),\ f(2)=0 \}$$

$$-\int_0^2 E(x) u'' v \, dx = \int_0^2 0 \cdot v \, dx$$

$$-E(x)u'v\Big|_0^2 + \int_0^2 E(x)u'v'dx = 0$$

$$-[\underbrace{E(2)u'(2)v(2)}_{0} - \underset{\overset{\shortparallel}{2}}{E(0)}\,\underset{\downarrow}{u'(0)}v(0)] + \int_0^2 E(x)\, u'v'dx = 0$$

$$u'(0) = 10 - u(0)$$

$$+20\,v(0) - 2u(0)v(0) + \int_0^2 E(x)u'v'dx = 0$$

$$\underbrace{-2u(0)v(0) + \int_0^2 E(x)u'v'dx}_{B(u,v)} = \underbrace{-20\,v(0)}_{L(v)}$$

$$u \in \{ f \in H^1(\Omega) : f(0) = 3 \}$$

$$\left|\begin{array}{l} u = \bar{u} + w \\ \bar{u}(2) = 3 \\ \bar{u}(x) = 3 \end{array}\right| \Rightarrow B(u,v) = B(\bar{u}+w, v) = B(\bar{u},v) + B(w,v)$$

$$B(w,v) = \underbrace{L(v) - B(\bar{u}, v)}_{\bar{L}(v)}$$

Szukamy takiego $\underset{\in V}{w}$, że $B(w,v) = \bar{L}(v)$ dla $\forall_{v \in V}$.