4.2 Wibracje akustyczne warstwy materiału

$$-\frac{d^2u(x)}{dx^2} - u = \sin x$$

$$u(0) = 0$$

$$\frac{du(2)}{dx} - u(2) = 0 \Rightarrow \frac{du(2)}{dx} = u(2)$$

Gdzie u to poszukiwana funkcja

$$[0,2] \ni x \to u(x) \in \mathbb{R}$$

$$-u'' - u = \sin x$$

$$\int_0^2 v u'' dx + \int_0^2 v u \, dx = -\int_0^2 \sin x \, v \, dx$$

$u = \overline{u} + w$

$w, v \in U \subset H^1$

$U = \{ f \in H^1 : f(0) = 0 \}$

$\overline{u}(0) = 0, \ \overline{u}(x) = 0$

$u = w$

$$\int v u'' dx = v u' - \int v' u' dx$$

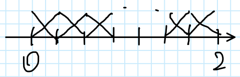
$v(0) = 0 \Rightarrow v(0) u'(0) = 0$

$$[v u']_0^2 = v(2) u'(2) = v(2) u(2)$$

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

$B(u, v) = L(v)$ $\qquad u = w = \alpha_0 \cdot e_0 + \alpha_1 e_1 + \ldots + \alpha_{n-1} e_{n-1}$

jako, że $u = w$ też $\qquad B(w, v) = \overline{L}(v)$



$$\begin{bmatrix} B(e_0, e_0), & B(e_0, e_1) & \ldots \\ B(e_1, e_0), & B(e_1, e_1) & \ldots \\ \vdots & & \ddots \end{bmatrix} \begin{bmatrix} \alpha_0 \\ \alpha_1 \\ \vdots \end{bmatrix} = \begin{bmatrix} \overline{L}(e_0) \\ \overline{L}(e_1) \\ \vdots \end{bmatrix}$$

$w \in U$

$w(0) = 0 \Rightarrow \alpha_0 = 0$

$$B(e_i, e_j) = e_i(2) e_j(2) - \int_0^2 e_i' e_j' dx + \int_0^2 e_i e_j \, dx$$

$$\overline{L}(e_i) = -\int_0^2 \sin x \, e_i \, dx$$