Sformułowanie silne

$$\frac{d^2\varphi}{dx^2} = -\frac{\rho}{\boldsymbol{\varepsilon}_r}$$

$$\varphi'(0) + \varphi(0) = 5$$

$$\varphi(3) = 2$$

$$\rho = 1$$

$$\boldsymbol{\varepsilon}_r = \begin{cases} 10 & dla\ x \in [0,1] \\ 5 & dla\ x \in (1,2] \\ 1 & dla\ x \in (2,3] \end{cases}$$

Ω = <0, 3>

Przekształcenie do sformułowania słabego (wariacyjnego)

$$\varphi''(x) = -\frac{\rho}{\boldsymbol{\varepsilon}_r}$$

$$\varphi''(x)v(x) = -\frac{\rho}{\boldsymbol{\varepsilon}_r}v(x)$$

$$\int_0^3 \varphi''(x)v(x) = \int_0^3 -\frac{\rho}{\boldsymbol{\varepsilon}_r}v(x)$$

$$[\varphi'(x)v(x)]_0^3 - \int_0^3 \varphi'(x)v'(x) = \int_0^3 -\frac{\rho}{\boldsymbol{\varepsilon}_r}v(x)$$

$$\varphi'(3)v(3) - \varphi'(0)v(0) - \int_0^3 \varphi'(x)v'(x) = \int_0^3 -\frac{\rho}{\boldsymbol{\varepsilon}_r}v(x)$$

$$-\varphi'(0)v(0) - \int_0^3 \varphi'(x)v'(x) = \int_0^3 -\frac{\rho}{\boldsymbol{\varepsilon}_r}v(x)$$

$$-(5 - \varphi(0))v(0) - \int_0^3 \varphi'(x)v'(x) = \int_0^3 -\frac{\rho}{\boldsymbol{\varepsilon}_r}v(x)$$

$$-5v(0) + \varphi(0)v(0) - \int_0^3 \varphi'(x)v'(x) = \int_0^3 -\frac{\rho}{\boldsymbol{\varepsilon}_r}v(x)$$

$$\varphi(0)v(0) - \int_0^3 \varphi'(x)v'(x) = 5v(0) - \int_0^3 \frac{\rho}{\boldsymbol{\varepsilon}_r}v(x)$$

$$B(\varphi, v) = L(v)$$