

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

$$x \in (0, 2]$$

$$u(0) = 0$$

$$u'(2) = u(2) \Rightarrow u'(2) = u(2)$$

$$\int_0^2 -u'' v \, dx = \int_0^2 v \sin x \, dx \quad (v(0) = 0, v(2) = 0) \quad \text{Boundary}$$

$$\int_0^2 -u'' v \, dx = \left[u v' - u' v \right]_0^2 = -u'(2)v(2) + \int_0^2 u v' \, dx - u(2)v(2) =$$

$$= \int_0^2 u v' \, dx - u(2)v(2)$$

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

$$B(u, v) = L(v);$$

$$B(u, v) = \int_0^2 u v' - u v \, dx - u(2)v(2); \quad L(v) = \int_0^2 v \sin x \, dx$$