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let $p: [0,1] \rightarrow \mathbb{R}$

$c: [0,1] \rightarrow \mathbb{R}$ smooth.

let

$$X := \{ u \in C^2[0,1] : u(0) = u(1) = 0 \}$$

Define

$$L(u)(x) := \frac{d}{dx} (p(x) u'(x)) + c(x) u(x)$$

Show L "self adjoint on X ",

By this I mean you
need to show

$\forall u, v \in X$

L^2

$$\int_0^1 (L(u)(x)) v(x) dx = \int_0^1 u(x) (L(v)(x)) dx.$$