



Figure 7: Rigid beam for problem 41.

41. **Trigger mechanism.** (p.176) Consider a completely rigid beam of length  $2L$  as shown in fig. 7, with simple supports  $A$  and  $B$  at points  $x = 0$  and  $x = L$ . The distributed load acts perpendicularly to the beam, with positive force directed downward. The estimated load is:

$$\tilde{f}(x) = \mu x/L \quad (125)$$

where  $\mu > 0$ .

The uncertainty in the load is represented by:

$$\mathcal{U}(h) = \left\{ f(x) : \left| \frac{f(x) - \tilde{f}(x)}{\mu} \right| \leq h \right\}, \quad h \geq 0 \quad (126)$$

We require that the reaction force at support  $B$  be no less than the critical value  $R_c$ .

Derive an explicit expression for the robustness function.