



Figure 7: Rigid beam for problem 41.

41. **Trigger mechanism.** (p.88) 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:

$$\tilde{f}(x) = \mu x/L \quad (122)$$

where $\mu > 0$.

The uncertainty in the load is represented by:

$$\mathcal{U}(h) = \left\{ f(x) : \left| \frac{f(x) - \tilde{f}(x)}{\mu} \right| \leq h \right\}, \quad h \geq 0 \quad (123)$$

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.