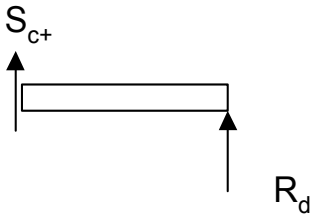
CE 342 - Fall 1999
Exam #1 Problem #1
RJN 9/29/99

$kip := 1000 \cdot lbf$

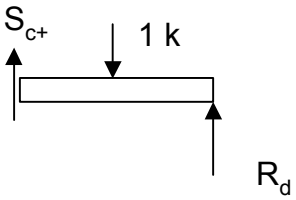
Shear just to the right of the pin at c.
For load from a to left of c, (0 < x < 4L/3)
FBD of cd



$\Sigma M_d = 0$

$S_c := 0 \cdot kip$

Load from c to d (4L/3 < x < 2L)
FBD of cd

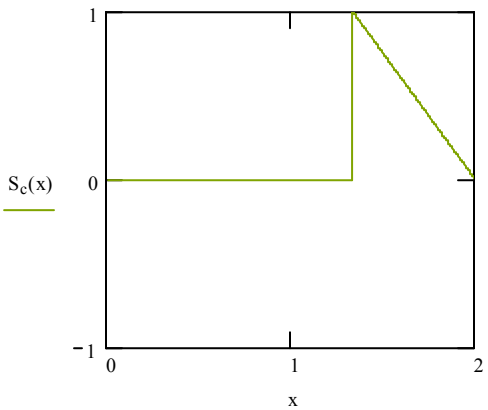


$\Sigma M_d = 0$

$$-\left(\frac{2 \cdot L}{3} \cdot S_c\right) + 1 \cdot kip \cdot (2 \cdot L - x) = 0$$

$$S_c = \frac{-3}{2} \cdot kip \cdot \frac{(-2 \cdot L + x)}{L}$$

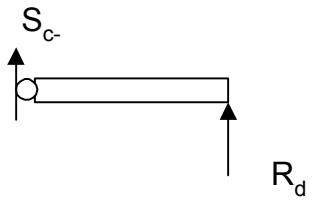
$$S_c(x) := \begin{cases} 0 \text{ if } (x > 0) + \left(x < \frac{4}{3}\right) \\ \frac{-3}{2} \cdot (-2 + x) \text{ if } \frac{4}{3} < x < 2 \\ 0 \text{ otherwise} \end{cases}$$



$x := 1, 1.01 .. 2$

Shear just to the right of the pin at c.

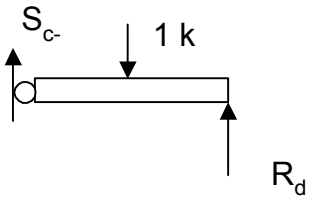
For load from a to left of c, (0 < x < 4L/3)
FBD of cd



$\Sigma M_d = 0$

$S_c := 0 \cdot kip$

Load from c to d (4L/3 < x < 2L)
FBD of cd



$\Sigma M_d = 0$

$$-\left(\frac{2 \cdot L}{3} \cdot S_c\right) + 1 \cdot kip \cdot (2 \cdot L - x) = 0$$

$$S_c = \frac{-3}{2} \cdot kip \cdot \frac{(-2 \cdot L + x)}{L}$$

$$S_c(x) := \begin{cases} 0 \text{ if } (x > 0) + \left(x < \frac{4}{3}\right) \\ \frac{-3}{2} \cdot (-2 + x) \text{ if } \frac{4}{3} < x < 2 \\ 0 \text{ otherwise} \end{cases}$$

$x := 1, 1.01 .. 2$