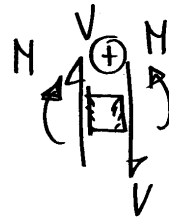
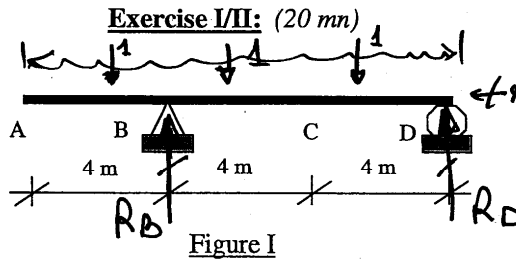


INFLUENCE LINES (1)

CIVE311 – STRUCTURES I

(Wednesday, February 27, 2008)

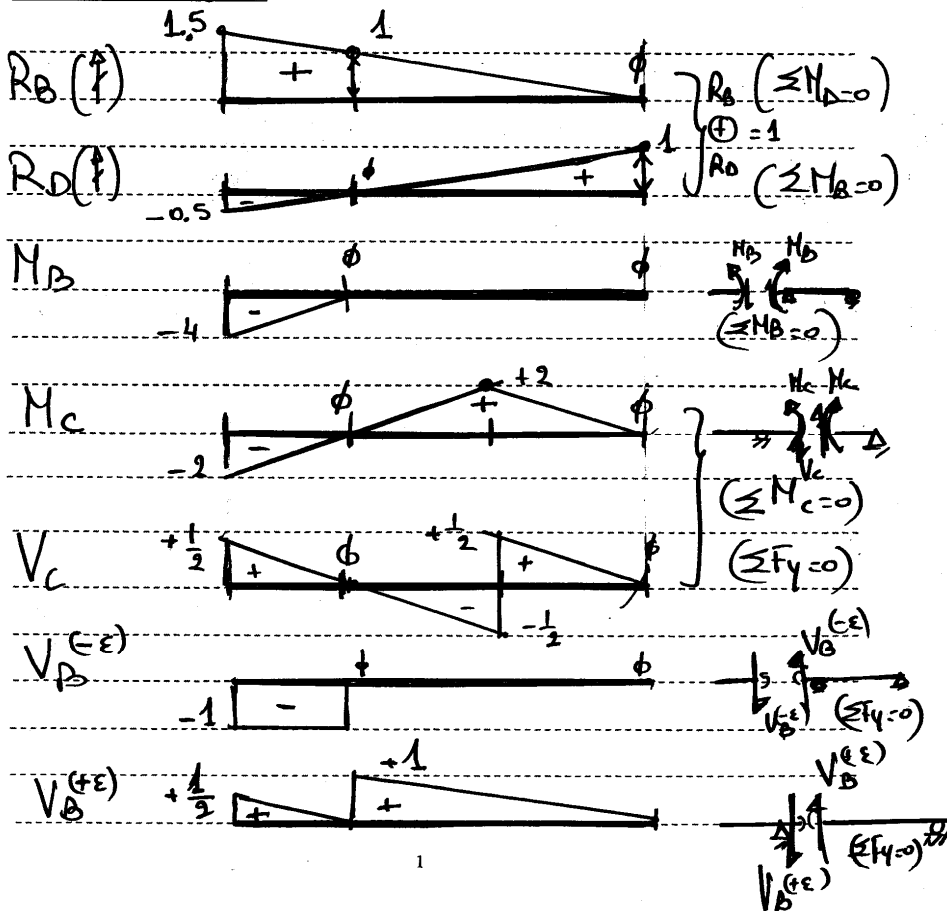


Referring to Figure I, draw the influence lines for R_B , M_B , M_C , and V_C .

(+ R_D + V_B)

Calculations and Diagrams:

Inf.



Exercise II/II: (40 mn) (taken from Quiz 1, Spring 2002-03)

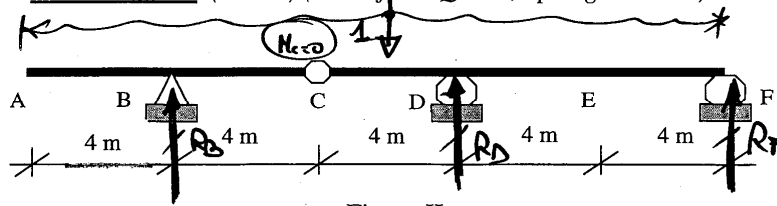
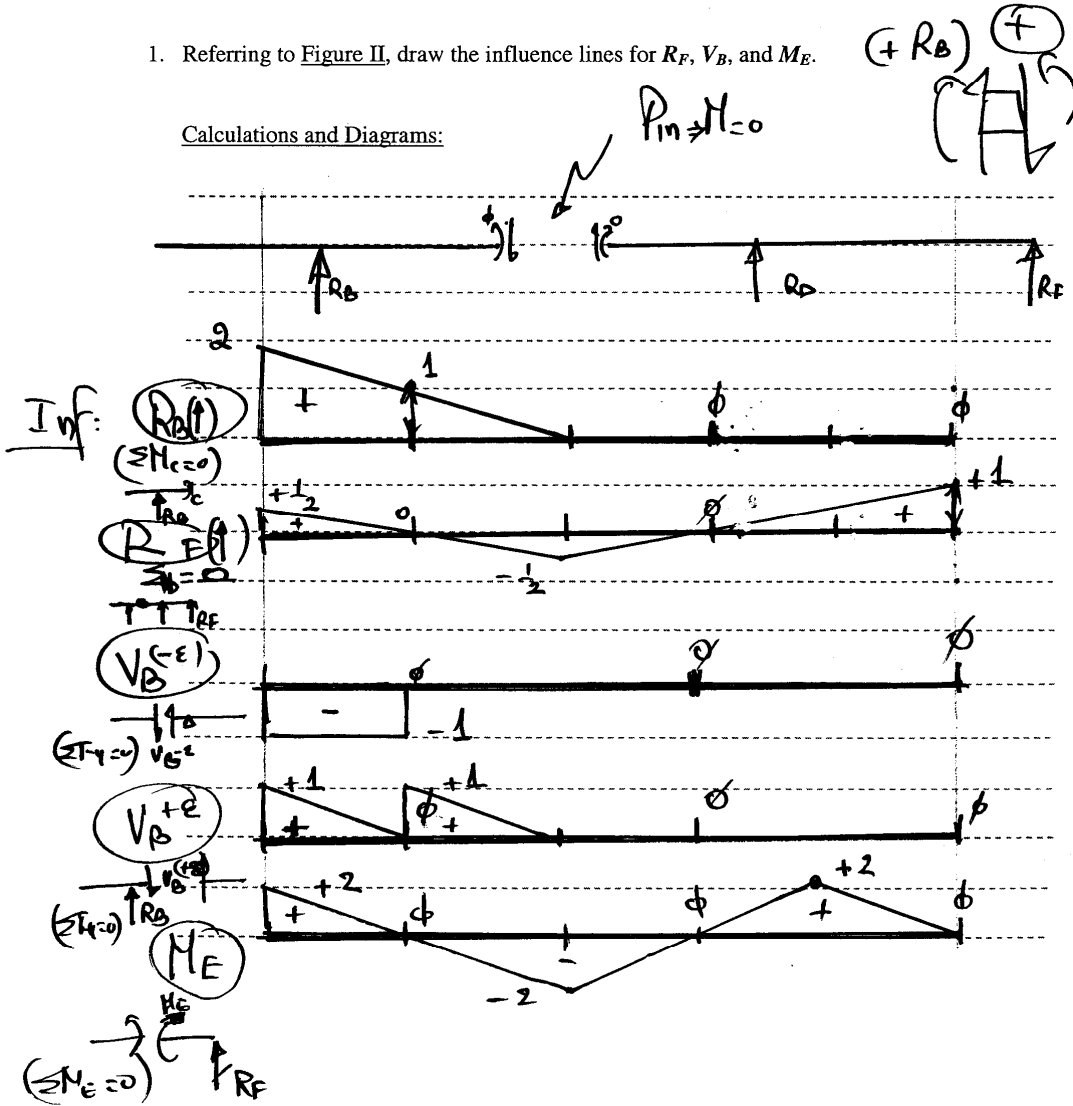


Figure II

1. Referring to Figure II, draw the influence lines for R_F , V_B , and M_E .

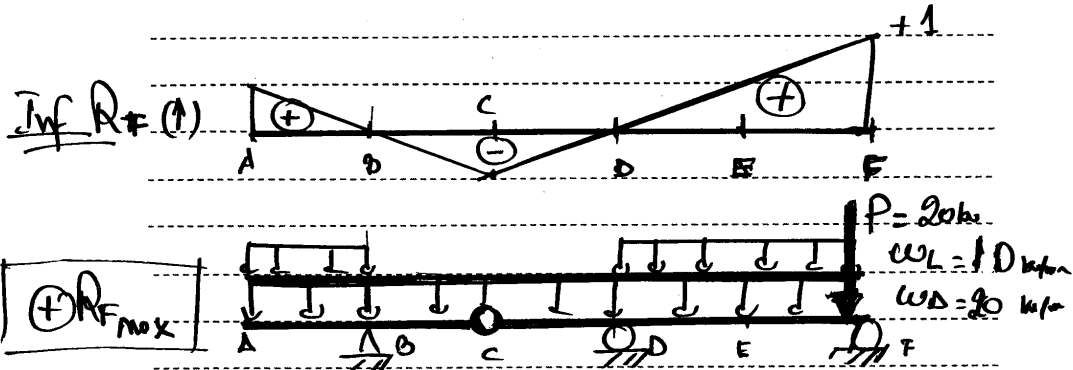
Calculations and Diagrams:



2. Let $w_D=20$ kN/m (dead load); $w_L=10$ kN/m and $P=20$ kN (live loads)
 Compute the maximum absolute value for R_F .

values
 ≡

Calculations and Diagrams:



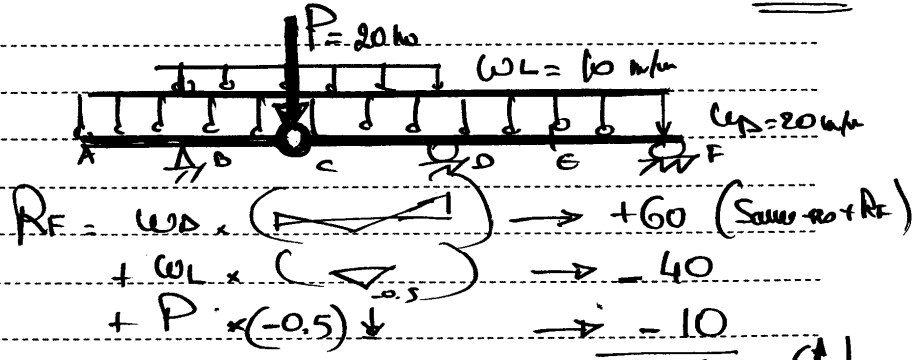
$$R_F = w_D \times \text{Area} \rightarrow +60$$

$$+ w_L \times \text{Area} \rightarrow +50$$

$$+ P \times (1) \rightarrow +20$$

$$\boxed{+R_{F \max} = +130 \text{ kN} (\uparrow)}$$

$\ominus R_{F \max}$: Note : It is obvious by inspection, that $|R_{F \max}| < |\ominus R_{F \max}|$
 But we need to calculate both $\uparrow \downarrow$



$$R_F = w_D \times \text{Area} \rightarrow +60 \text{ (Same as } R_F)$$

$$+ w_L \times \text{Area} \rightarrow -40$$

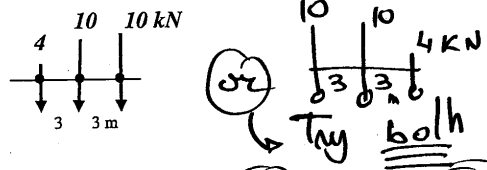
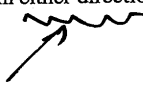
$$+ P \times (-0.5) \rightarrow -10$$

$$\boxed{+R_{F \min} = +10 \text{ kN} (\uparrow)}$$

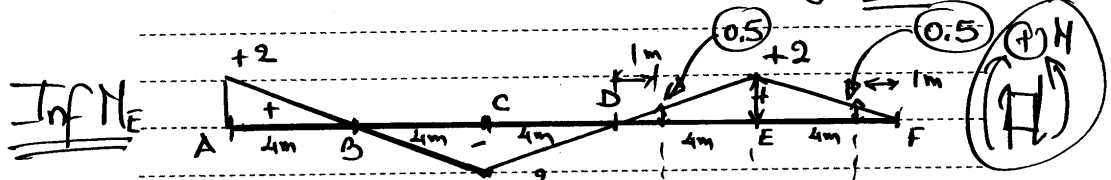
\Rightarrow (Try $P=100$ kN \rightarrow Then $\begin{cases} +R_{F \max} = +200 \text{ kN} \\ \ominus R_{F \max} = -30 \text{ kN} \end{cases}$)



3. Compute the maximum absolute value for M_E for the following truck moving load, which can travel in either directions.



Calculations and Diagrams:



Max (+) M_E Scenario 1

$M_E = 4 \times 0.5 + 10 \times 2 + 10 \times 0.5 = 27 \text{ kNm}$
 \Rightarrow Largest (+) M_E in this direction (by inspection)

Same if other direction (by inspection)

Max (+) $M_E = 27 \text{ kNm}$ (as shown above)

Max (-) M_E By inspection \rightarrow Same (-) (+)

Max (-) $M_E = 27 \text{ kNm}$

