PROBLEMA 1

b) cond. al bordo

AB) $\tau_{xy}^{(1)}(x, 2d) = 0$

$\sigma_y^{(1)}(x, 2d) = -\frac{qx}{2d}$

AC) $\sigma_x^{(1)}(0, y) = 0$

$\tau_{xy}^{(1)}(0, y) = 0$

BD) $\sigma_x^{(1)}(2d, y) = 0$

$\tau_{xy}^{(1)}(2d, y) = 0$

OC) $\sigma_x^{(2)}(0, y) = 0$

$\tau_{xy}^{(2)}(0, y) = 0$

CD) $\tau_{xy}^{(1)}(x, d) = \tau_{xy}^{(2)}(x, d)$

$\sigma_y^{(1)}(x, d) = \sigma_y^{(2)}(x, d)$

DE) $\sigma_x^{(2)}(2d, y) = 0$

$\tau_{xy}^{(2)}(2d, y) = 0$

c) il campo di spostamento e' cinematicamente ammissibile

$u(x, 0) = v(x, 0) = 0$; u e v sono funzioni regolari

d) Ad esempio : $\tau_{xy}^{(1)} = -\frac{G(1-\nu^2)qy}{2dE}$ non rispetta le equazioni ai limiti su AC, BD e AB.

e) Corpo 1 : $\sigma_x^{(1)} = -\frac{\nu qx}{2d}$; $\sigma_y^{(1)} = -\frac{qx}{2d}$; $\tau_{xy}^{(1)} = -\frac{1-\nu}{4d}qy$

Corpo 2 : $\sigma_x^{(2)} = -\frac{\nu(1-\nu^2)qx}{(4-\nu^2)d}$ $\sigma_y^{(2)} = -\frac{2(1-\nu^2)qx}{(4-\nu^2)d}$

$\tau_{xy}^{(2)} = -\left(\frac{1-\nu^2}{2+\nu}\right)\frac{qy}{2d}$

$\left.\begin{array}{l} b_x^{(1)} = -\frac{1+\nu}{4d}q \; ; \; b_y^{(1)} = 0 \\ b_x^{(2)} = \frac{1-\nu^2}{2(2-\nu)}q \; ; \; b_y^{(2)} = 0 \end{array}\right\}$ forze di volume

AB) $f_x = -\frac{1-\nu}{2}q$; $f_y = -\frac{qx}{2d}$

AC) $f_x = 0$; $f_y = \frac{1-\nu}{4d}qy$ BD) $f_x = -\nu q$; $f_y = -\frac{1-\nu}{4d}qy$

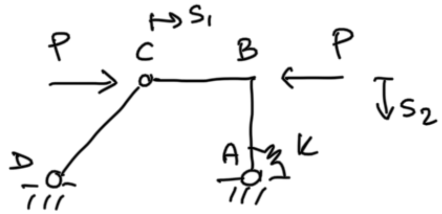
OC) $f_x = 0$; $f_y = \left(\frac{1-\nu^2}{2+\nu}\right)\frac{qy}{2d}$ DE) $f_x = -\frac{2\nu(1-\nu^2)}{4-\nu^2}q$; $f_y = -\left(\frac{1-\nu^2}{2+\nu}\right)\frac{qy}{2d}$

CD) $f_x = (1-\nu)\left(\frac{1+\nu}{2+\nu} - \frac{1}{2}\right)\frac{q}{2}$; $f_y = \left(\frac{2(1-\nu^2)}{4-\nu^2} - \frac{1}{2}\right)\frac{qx}{d}$

f) Reazioni vincolari :

$R_x = 0$; $R_y = \frac{4(1-\nu^2)}{4-\nu^2}qd$; $M_O = \frac{16(1-\nu^2)}{3(4-\nu^2)}qd^2$

PROBLEMA 2



$$\begin{cases} EJ v_1^{IV} + P v_1'' = 0 \\ EJ v_2^{IV} = 0 \end{cases}$$

1) $-EJ v_1'''(0) = -N_{CD}\dfrac{\sqrt{2}}{2} + P v_1'(0)$; $\qquad N_{CD} = -\dfrac{EA}{2\ell}\left[v_1(0) + v_2(0)\right]$

2) $-EJ v_1''(0) = 0$

3) $v_1'(\ell) = v_2'(0)$

4) $-EJ v_1''(\ell) = -EJ v_2''(0)$

5) $v_1(\ell) = 0$

6) $v_2(\ell) = 0$

7) $-EJ v_2''(\ell) = k v_2'(\ell)$

8) $-EJ v_2'''(\ell) = -N_{CD}\dfrac{\sqrt{2}}{2}$

b) $P_{cr} = \dfrac{k}{\ell} + EA\sqrt{2}$