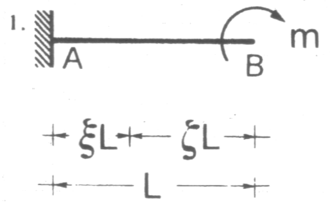
Tabella 6. Travi ad asse rettilineo, dati per varie situazioni di carico e vincolo.

1.



$Y_A = 0;\ M_A = -m$

$T = cost = 0$

$M = cost = -m$

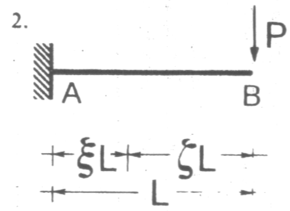
$\varphi = \frac{mL}{EI}\,\xi$

$\varphi_B = \frac{mL}{EI}$

$v = \frac{1}{2}\,\frac{mL^2}{EI}\,\xi^2$

$v_B = \frac{1}{2}\,\frac{mL^2}{EI}$

2.



$Y_A = P;\ M_A = -PL$

$T = cost = P$

$M = -PL\,\zeta$

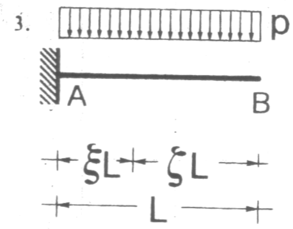
$\varphi = \frac{1}{2}\,\frac{PL^2}{EI}\,\xi\,(1+\zeta)$

$\varphi_B = \frac{1}{2}\,\frac{PL^2}{EI}$

$v = \frac{1}{6}\,\frac{PL^3}{EI}\,\xi^2\,(3-\xi)$

$v_B = \frac{1}{3}\,\frac{PL^3}{EI}$

3.



$Y_A = PL;\ M_A = -\frac{1}{2}\,PL^2$

$T = pL\,\zeta$

$M = -\frac{1}{2}\,pL^2\,\zeta^2$

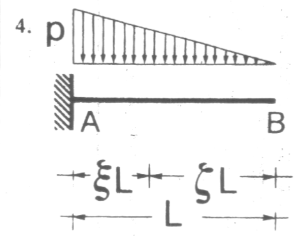
$\varphi = \frac{1}{6}\,\frac{pL^3}{EI}\,(1-\zeta^3)$

$\varphi_B = \frac{1}{6}\,\frac{pL^3}{EI}$

$v = \frac{1}{24}\,\frac{pL^4}{EI}\,[3-\zeta\,(4-\zeta^3)]$

$v_B = \frac{1}{8}\,\frac{pL^4}{EI}$

4.



$Y_A = \frac{1}{2}\,PL;\ M_A = -\frac{1}{6}\,PL^2$

$T = \frac{1}{2}\,pL\,\zeta^2$

$M = -\frac{1}{6}\,pL^2\,\zeta^3$

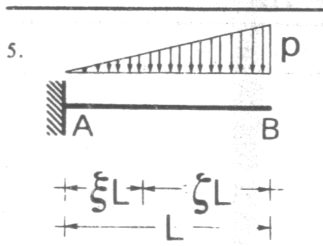
$\varphi = \frac{1}{24}\,\frac{pL^3}{EI}\,(1-\zeta^4)$

$\varphi_B = \frac{1}{24}\,\frac{pL^3}{EI}$

$v = \frac{1}{120}\,\frac{pL^4}{EI}\,[4-\zeta\,(5-\zeta^4)]$

$v_B = \frac{1}{30}\,\frac{pL^4}{EI}$

5.



$Y_A = \frac{1}{2}\,pL;\ M_A = -\frac{1}{3}\,pL^2$

$T = \frac{1}{2}\,pL\,\zeta\,(2-\zeta)$

$M = -\frac{1}{6}\,pL^2\,(3-\zeta)\,\zeta^2$

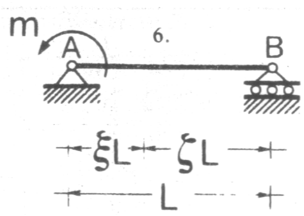
$\varphi = \frac{1}{24}\,\frac{pL^3}{EI}\,[3-\zeta^3\,(4-\zeta)]$

$\varphi_B = \frac{1}{8}\,\frac{pL^3}{EI}$

$v = \frac{1}{120}\,\frac{pL^4}{EI}\,[11-15\,\zeta+\zeta^4\,(5-\zeta)]$

$v_B = \frac{11}{120}\,\frac{pL^4}{EI}$

6.



$Y_A = -Y_B = \frac{m}{L}$

$T = cost = \frac{m}{L}$

$M = -m\,\zeta$

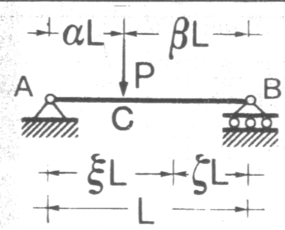
$\varphi = \frac{1}{6}\,\frac{mL}{EI}\,(1-3\,\zeta^2)$

$\varphi_A = -\frac{1}{3}\,\frac{mL}{EI}$

$\varphi_B = \frac{1}{6}\,\frac{mL}{EI}$

$v = -\frac{1}{6}\,\frac{mL^2}{EI}\,\zeta\,(1-\zeta^2)$

7.



— tronco AC:	— tronco CB:
$Y_A = P\,\beta$	$Y_B = P\,\alpha$
$T = cost = P\,\beta$	$T = cost = -P\,\alpha$
$M = PL\,\beta\,\xi$	$M = PL\,\alpha\,\zeta$

$M_{max} = M_C = PL\,\alpha\,\beta$

$\varphi = \frac{1}{6}\,\frac{PL^2}{EI}\,\beta\,(1-\beta^2-3\,\xi^2)$	$\varphi = -\frac{1}{6}\,\frac{PL^2}{EI}\,\alpha\,(1-\alpha^2-3\,\zeta^2)$
$\varphi_A = \frac{1}{6}\,\frac{PL^2}{EI}\,\beta\,(1-\beta^2)$	$\varphi_B = -\frac{1}{6}\,\frac{PL^2}{EI}\,\alpha\,(1-\alpha^2)$

$\varphi_C = \frac{1}{3}\,\frac{PL^2}{EI}\,\alpha\,\beta\,(\beta-\alpha)$

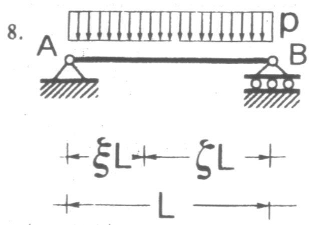
$v = \frac{1}{6}\,\frac{PL^3}{EI}\,\beta\,\xi\,(1-\beta^2-\xi^2)$	$v = \frac{1}{6}\,\frac{PL^3}{EI}\,\alpha\,\zeta\,(1-\alpha^2-\zeta^2)$

$v_C = \frac{1}{3}\,\frac{PL^3}{EI}\,\alpha^2\,\beta^2$

(segue)

(seguito tabella 6)

8.



$$Y_A = Y_B = \frac{1}{2}\, pL$$

$$T = \frac{1}{2}\, pL\,(1-2\,\xi)$$

$$M = \frac{1}{2}\, pL^2\, \zeta\, \xi$$

$$\xi = \frac{1}{2} : M = M_{\max} = \frac{1}{8}\, pL^2$$

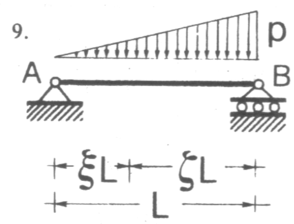
$$\varphi = \frac{1}{24}\,\frac{pL^3}{EI}\,[1+2\,\xi^2\,(2\,\xi-3)]$$

$$\varphi_A = -\varphi_B = \frac{1}{24}\,\frac{pL^3}{EI}$$

$$v = \frac{1}{24}\,\frac{pL^4}{EI}\,\zeta\,\xi\,(1+\zeta\,\xi)$$

$$\xi = \frac{1}{2} : v = v_{\max} = \frac{5}{384}\,\frac{PL^4}{EI}$$

9.



$$Y_A = \frac{1}{6}\, pL;\quad Y_B = \frac{1}{3}\, pL$$

$$T = \frac{1}{6}\, pL\,(1-3\,\xi^2)$$

$$M = \frac{1}{6}\, pL^2\,\zeta\,\xi\,(1+\xi)$$

$$\xi = \frac{\sqrt{3}}{3} : M = M_{\max} = \frac{\sqrt{3}}{27}\, pL^2$$

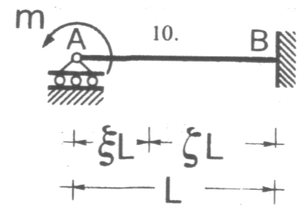
$$\varphi = \frac{1}{360}\,\frac{pL^3}{EI}\,[7-15\,\xi^2(2-\xi^2)]$$

$$\varphi_A = \frac{7}{360}\,\frac{pL^3}{EI}$$

$$\varphi_B = -\frac{8}{360}\,\frac{pL^3}{EI}$$

$$v = \frac{1}{360}\,\frac{pL^4}{EI}\,\zeta\,\xi\,(1+\xi)(7-3\,\xi^2)$$

10.



$$Y_A = -Y_B = \frac{3}{2}\,\frac{m}{L}$$

$$M_B = \frac{1}{2}\, m$$

$$T = cost = -\frac{3}{2}\,\frac{m}{L}$$

$$M = -\frac{1}{2}\, m\,(2-3\,\xi)$$

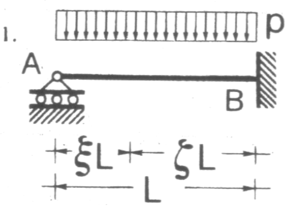
$$\varphi = \frac{1}{4}\,\frac{mL}{EI}\,\zeta\,(2-3\,\zeta)$$

$$\varphi_A = -\frac{1}{4}\,\frac{mL}{EI}$$

$$v = -\frac{1}{4}\,\frac{mL^2}{EI}\,\xi\,\zeta^2$$

$$\xi = \frac{1}{3} : v = v_{\min} = -\frac{1}{27}\,\frac{mL^2}{EI}$$

11.



$$Y_A = \frac{3}{8}\, pL;\quad Y_B = \frac{5}{8}\, pL$$

$$M_B = -\frac{1}{8}\, pL^2$$

$$T = pL\left(\frac{3}{8}-\xi\right)$$

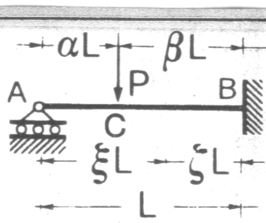
$$M = \frac{1}{8}\, PL^2\,\xi\,(3-4\,\xi)$$

$$\varphi = \frac{1}{48}\,\frac{pL^3}{EI}\,\zeta\,(1+\xi-8\,\xi^2)$$

$$\varphi_A = \frac{1}{48}\,\frac{pL^3}{EI}$$

$$v = \frac{1}{48}\,\frac{pL^4}{EI}\,\xi\,\zeta^2\,(1+2\,\xi)$$

12.



— tronco AC:

$$Y_A = \frac{1}{2}\, P\,\beta^2\,(2+\alpha)$$

$$T = cost = Y_A$$

$$M = \frac{1}{2}\, PL\,\xi\,\beta^2\,(2+\alpha)$$

$$\varphi = \frac{1}{4}\,\frac{PL^2}{EI}\,\beta^2\,[\alpha-(2+\alpha)\,\xi^2];$$

$$\varphi_A = \frac{1}{4}\,\frac{PL^2}{EI}\,\alpha\,\beta^2$$

$$v = \frac{1}{12}\,\frac{PL^3}{EI}\,\xi\beta^2\,[3\alpha-(2+\alpha)\,\xi^2]$$

— tronco CB:

$$Y_B = \frac{1}{2}\, P\,\alpha\,(3-\alpha^2)$$

$$M_B = -\frac{1}{2}\, PL\,\alpha\,(1-\alpha^2)$$

$$T = cost = -Y_B$$

$$M = \frac{1}{2}\, PL\,\alpha\,(3\,\zeta+\alpha^2\,\xi-1)$$

$$\varphi = \frac{1}{4}\,\frac{PL^2}{EI}\,\alpha\,\beta^2\,(1-2\,\alpha-\alpha^2)$$

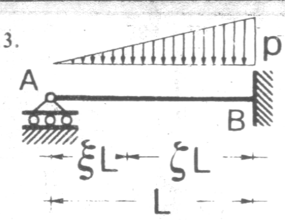
$$v = \frac{1}{12}\,\frac{PL^3}{EI}\,\alpha\,\zeta^2\,[3\,(1-\alpha^2) + -(3-\alpha^2)\,\zeta]$$

$$M_C = PL\,\alpha\,\beta^2\,(2+\alpha)$$

$$\varphi_C = \frac{1}{4}\,\frac{PL^2}{EI}\,\alpha\,\beta^2\,(1-2\alpha-\alpha^2)$$

$$v_C = \frac{1}{12}\,\frac{PL^3}{EI}\,\alpha^2\,\beta^3\,(3+\alpha)$$

13.



$$Y_B = \frac{1}{10}\, pL;\quad Y_B = \frac{2}{5}\, pL$$

$$M_B = -\frac{1}{15}\, pL^2$$

$$T = \frac{1}{10}\, pL\,(1-5\,\xi^2)$$

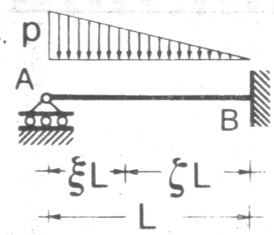
$$M = \frac{1}{10}\, pL^2\,\xi\,(3-5\,\xi^2)$$

$$\varphi = \frac{1}{120}\,\frac{pL^3}{EI}\cdot\zeta\,(1+\xi)\,(1-5\xi^2)$$

$$\varphi_A = \frac{1}{120}\,\frac{pL^3}{EI}$$

$$v = \frac{1}{120}\,\frac{pL^4}{EI}\,\xi\,\zeta^2\,(1+\xi)^2$$

14.



$$Y_A = \frac{11}{40}\, pL;\quad Y_b = \frac{9}{40}\, pL$$

$$M_B = -\frac{7}{120}\, pL^2$$

$$T = \frac{1}{40}\, pL\,(20\,\zeta^2-9)$$

$$M = \frac{1}{120}\, pL^2\,\xi\,(20\,\zeta^2+20\,\zeta-7)$$

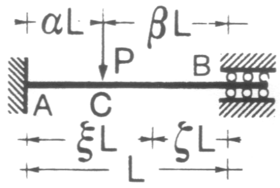
$$\varphi = \frac{1}{240}\,\frac{pL^3}{EI}\,\zeta\,(27\,\zeta + -10\,\zeta^3-14)$$

$$\varphi_A = \frac{1}{80}\,\frac{pL^3}{EI}$$

$$v = \frac{1}{240}\,\frac{pL^4}{EI}\,\xi\,\zeta^2\,(7-2\,\zeta-2\,\zeta^2)$$

(segue)

15.



— tronco AC:

$Y_A = P\,\beta^2\,(1+2\,\alpha)$

$M_A = -PL\,\alpha\,\beta^2$

$T = cost = Y_A$

$M = PL\,\beta^2\,[\xi\,(1+2\,\alpha)-\alpha]$

— tronco CB:

$Y_B = P\,\alpha^2\,(1+2\,\beta)$

$M_B = -PL\,\alpha^2\,\beta$

$T = cost = -Y_B$

$M = PL\,\alpha^2\,[\zeta\,(1+2\,\beta)-\beta]$

$$M_C = 2\,PL\,\alpha^2\,\beta^2$$

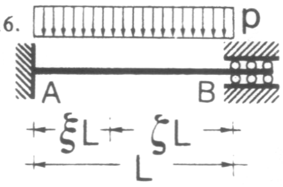
$\varphi = \frac{1}{2}\,\frac{PL^2}{EI}\,\beta^2\,\xi\,[2\alpha-\xi(1+2\alpha)]$ $\qquad \varphi = -\frac{1}{2}\,\frac{PL^2}{EI}\,\alpha^2\,\zeta\,[2\beta-\zeta(1+2\beta)]$

$$\varphi_C = \frac{1}{2}\,\frac{PL^2}{EI}\,\alpha^2\,\beta^2\,(1-2\,\alpha)$$

$v = \frac{1}{6}\,\frac{PL^3}{EI}\,\beta^2\,\xi^2\,[3\alpha-\xi(1+2\alpha)]$ $\qquad v = \frac{1}{6}\,\frac{PL^3}{EI}\,\alpha^2\,\zeta^2\,[3\beta-\zeta(1+2\beta)]$

$$v_C = \frac{1}{3}\,\frac{PL^3}{EI}\,\alpha^3\,\beta^3$$

16.



$Y_A = Y_B = \frac{1}{2}\,pL$

$M_A = M_B = -\frac{1}{12}\,pL^2$

$T = \frac{1}{2}\,pL\,(1-2\,\xi)$

$M = -\frac{1}{12}\,pL^2\,(1-6\,\xi\,\zeta)$

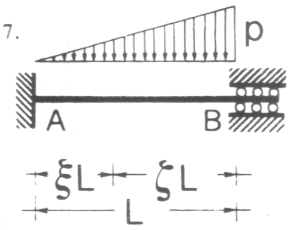
$\xi = \frac{1}{2}$: $M = \frac{1}{24}\,pL^2$

$\varphi = \frac{1}{12}\,\frac{pL^3}{EI}\,\xi\,\zeta\,(1-2\,\xi)$

$v = \frac{1}{24}\,\frac{pL^4}{EI}\,\xi^2\,\zeta^2$

$\xi = \frac{1}{2}$: $v = \frac{1}{384}\,\frac{pL^4}{EI}$

17.



$Y_A = \frac{3}{20}\,pL$; $Y_B = \frac{7}{20}\,pL$

$M_A = -\frac{1}{30}\,pL^2$; $M_B = -\frac{1}{20}\,pL^2$

$T = \frac{1}{20}\,pL\,(3-10\,\xi^2)$

$M = -\frac{1}{60}\,pL^2\,(2-9\,\xi+10\,\xi^3)$

$\varphi = \frac{1}{120}\,\frac{pL^3}{EI}\,\xi\,\zeta\,(4-5\,\xi-5\,\xi^2)$

$v = \frac{1}{120}\,\frac{pL^4}{EI}\,\xi^2\,\zeta^2\,(2+\xi)$