Tabella VI

Coordinate $\bar{x}$ e $\bar{y}$ del baricentro, area della superficie o lunghezza della linea

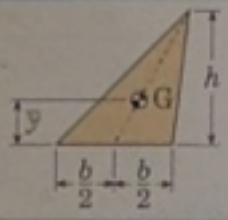
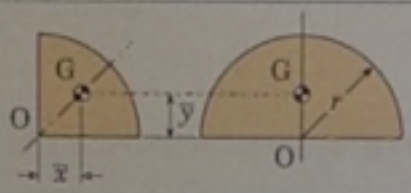
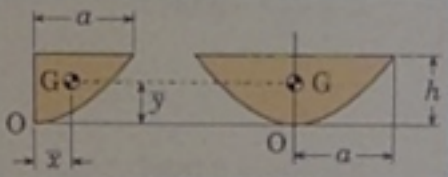
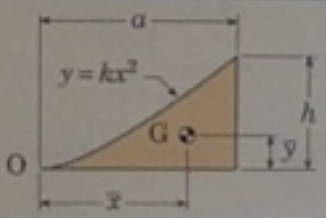
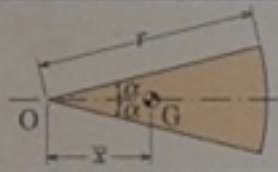
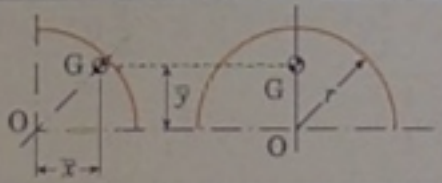
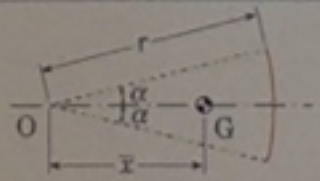
	Forma		$\bar{x}$	$\bar{y}$	*Area o lunghezza*
SUPERFICI	Area triangolare			$\frac{h}{3}$	$\frac{bh}{2}$
	Area di un quarto di cerchio		$\frac{4r}{3\pi}$	$\frac{4r}{3\pi}$	$\frac{\pi r^2}{4}$
	Area di un semicerchio		0	$\frac{4r}{3\pi}$	$\frac{\pi r^2}{2}$
	Area di una semiparabola		$\frac{3a}{8}$	$\frac{3h}{5}$	$\frac{2ah}{3}$
	Area parabolica		0	$\frac{3h}{5}$	$\frac{4ah}{3}$
	Triangolo parabolico		$\frac{3a}{4}$	$\frac{3h}{10}$	$\frac{ah}{3}$
	Settore circolare		$\frac{2r\sin\alpha}{3\alpha}$	0	αr^2
LINEE	Arco di un quarto di circonferenza		$\frac{2r}{\pi}$	$\frac{2r}{\pi}$	$\frac{\pi r}{2}$
	Arco di semicirconferenza		0	$\frac{2r}{\pi}$	πr
	Arco di circonferenza		$\frac{r\sin\alpha}{\alpha}$	0	$2\alpha r$

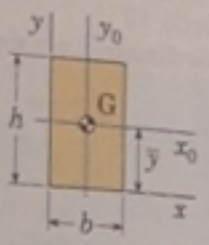
Tabella VII

Momenti di inerzia di superfici: area A, momento di inerzia assiale I, momento di inerzia polare J, modulo di resistenza a flessione Z, raggio di inerzia k e ordinata del baricentro $\bar{y}$ (con x_0 e y_0 assi passanti per il baricentro G)

Rettangolo

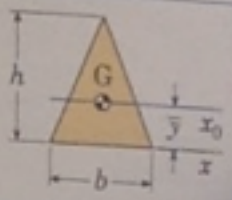
$$A = bh \qquad I_{x0} = \frac{bh^3}{12} \qquad Z = \frac{bh^2}{6} \qquad k_{x0} = 0{,}289h \qquad \bar{y} = \frac{h}{2}$$

$$I_{y0} = \frac{b^3h}{12} \qquad I_x = \frac{bh^3}{3} \qquad I_y = \frac{b^3h}{3} \qquad J_G = \frac{bh(b^2+h^2)}{12}$$



Triangolo

$$A = \frac{bh}{2} \qquad I_{x0} = \frac{bh^3}{36} \qquad Z = \frac{bh^2}{24} \qquad k_{x0} = 0{,}236h \qquad \bar{y} = \frac{h}{3} \qquad I_x = \frac{bh^3}{12}$$



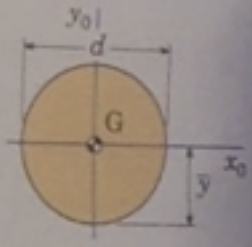
Cerchio in funzione del diametro d oppure del raggio r

$$A = \frac{\pi d^2}{4} \qquad I_{x0} = I_{y0} = \frac{\pi d^4}{64} \qquad Z = \frac{\pi d^3}{32} = 0{,}1d^3$$

$$J_G = \frac{\pi d^4}{32} \qquad k_{x0} = \frac{d}{4} \qquad \bar{y} = \frac{d}{2}$$

$$A = \pi r^2 \qquad I_{x0} = I_{y0} = \frac{\pi r^4}{4} \qquad Z = \frac{\pi r^3}{4} = 0{,}785r^2$$

$$J_G = \frac{\pi r^4}{2} \qquad k_{x0} = \frac{r}{2} \qquad \bar{y} = r$$



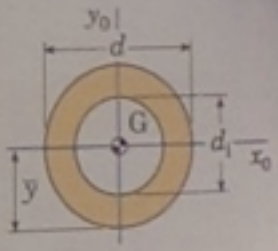
Corona circolare in funzione dei diametri esterno d ed interno d_i oppure dei raggi esterno r e interno r_i

$$A = \frac{\pi}{4}(d^2 - d_i^2) \qquad I_{x0} = I_{y0} = \frac{\pi}{64}(d^4 - d_i^4) \qquad Z = \frac{\pi}{32d}(d^4 - d_i^4)$$

$$J_G = \frac{\pi}{32}(d^4 - d_i^4) \qquad k_{x0} = \sqrt{\frac{d^2 + d_i^2}{16}} \qquad \bar{y} = \frac{d}{2}$$

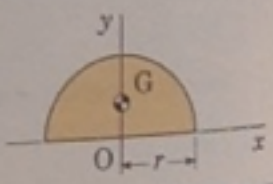
$$A = \pi(r^2 - r_i^2) \qquad I_{x0} = I_{y0} = \frac{\pi}{4}(r^4 - r_i^4) \qquad Z = \frac{\pi}{4r}(r^4 - r_i^4)$$

$$J_G = \frac{\pi}{2}(r^4 - r_i^4) \qquad k_{x0} = \sqrt{\frac{r^2 + r_i^2}{4}} \qquad \bar{y} = r$$



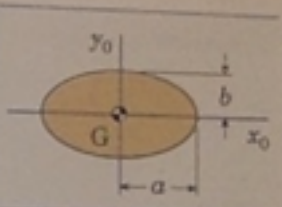
Semicerchio

$$I_x = I_y = \frac{\pi r^4}{8} \qquad J_O = \frac{\pi r^4}{4}$$



Ellisse

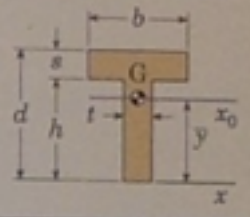
$$I_{x0} = \frac{\pi a b^3}{4} \qquad I_{y0} = \frac{\pi a^3 b}{4} \qquad J_G = \frac{\pi a b (a^2 + b^2)}{4}$$



Sezione a T

$$A = bs + ht \qquad \bar{y} = d - \frac{d^2 t + s^2 (b - t)}{2(bs + ht)}$$

$$I_{x0} = \frac{1}{3}[t\bar{y}^3 + b(d - \bar{y})^3 - (b - t)(d - \bar{y} - s)^3] \qquad Z = \frac{I_{x0}}{\bar{y}} \qquad k_{x0} = \sqrt{\frac{I_{x0}}{A}}$$



Sezione a doppio T

$$A = bd - h(b - t) \qquad \bar{y} = \frac{d}{2}$$

$$I_{x0} = \frac{bd^3 - h^3(b - t)}{12} \qquad Z = \frac{bd^3 - h^3(b - t)}{6d} \qquad k_{x0} = \sqrt{\frac{I_{x0}}{A}}$$

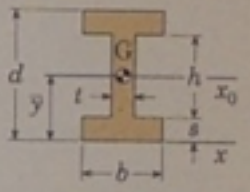
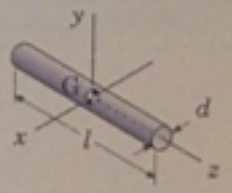


Tabella VIII

Massa m e momenti di inerzia di massa I di corpi solidi (ρ massa volumica del corpo)

Barra

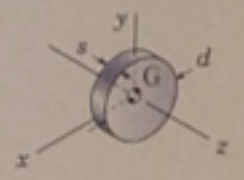
$$m = \frac{\pi d^2 l}{4}\rho \qquad I_{xx} = I_{yy} = \frac{ml^2}{12}$$



Disco circolare sottile in funzione del diametro d oppure del raggio r

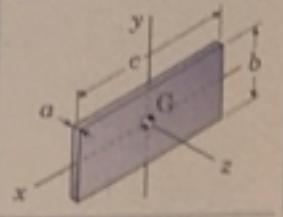
$$m = \frac{\pi d^2 s}{4}\rho \qquad I_{zz} = \frac{md^2}{8} \qquad I_{xx} = I_{yy} = \frac{md^2}{16}$$

$$m = \pi r^2 s\rho \qquad I_{zz} = \frac{mr^2}{2} \qquad I_{xx} = I_{yy} = \frac{mr^2}{4}$$



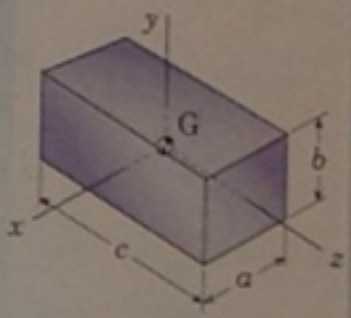
Piastra rettangolare sottile

$$m = abc\rho \qquad I_{zz} = \frac{m(b^2 + c^2)}{12} \qquad I_{xx} = \frac{mb^2}{12} \qquad I_{yy} = \frac{mc^2}{12}$$



Prisma rettangolare

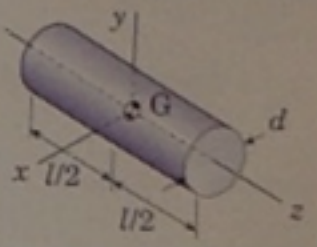
$$m = abc\rho \qquad I_{zz} = \frac{m(a^2 + b^2)}{12} \qquad I_{xx} = \frac{m(b^2 + c^2)}{12} \qquad I_{yy} = \frac{m(a^2 + c^2)}{12}$$



Cilindro in funzione del diametro d oppure del raggio r

$$m = \frac{\pi d^2 l}{4}\rho \qquad I_{zz} = \frac{md^2}{8} \qquad I_{xx} = I_{yy} = \frac{m(3d^2 + 4l^2)}{48}$$

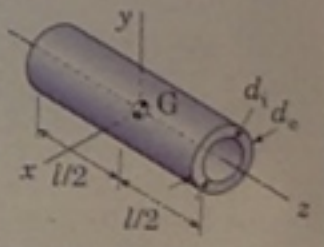
$$m = \pi r^2 l\rho \qquad I_{zz} = \frac{mr^2}{2} \qquad I_{xx} = I_{yy} = \frac{m(3r^2 + l^2)}{12}$$



Cilindro cavo in funzione dei diametri esterno d_e ed interno d_i oppure dei raggi esterno r_e ed interno r_i

$$m = \frac{\pi l}{4}(d_e^2 - d_i^2)\rho \qquad I_{zz} = \frac{m}{8}(d_e^2 - d_i^2) \qquad I_{xx} = I_{yy} = \frac{m}{48}(3d_e^2 + d_i^2 + 4l^2)$$

$$m = \pi l(r_e^2 - r_i^2)\rho \qquad I_{zz} = \frac{m}{2}(r_e^2 - r_i^2) \qquad I_{xx} = I_{yy} = \frac{m}{12}(3r_e^2 + 3r_i^2 + l^2)$$



Sfera

$$m = \frac{4\pi r^3}{3}\rho \qquad I_{zz} = I_{xx} = I_{yy} = \frac{2}{5}mr^2$$

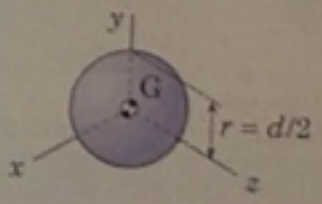


Tabella II **Prefissi delle unità di misura SI**

Fattore di moltiplicazione	*Nome del prefisso*	*Simbolo del prefisso*
$0{,}000000000000000001 = 10^{-18}$	atto	a
$0{,}000000000000001 = 10^{-15}$	femto	f
$0{,}000000000001 = 10^{-12}$	pico	p
$0{,}000000001 = 10^{-9}$	nano	n
$0{,}000001 = 10^{-6}$	micro	μ
$0{,}001 = 10^{-3}$	milli	m
$1.000 = 10^{3}$	kilo	k
$1.000.000 = 10^{6}$	mega	M
$1.000.000.000 = 10^{9}$	giga	G
$1.000.000.000.000 = 10^{12}$	tera	T
$1.000.000.000.000.000 = 10^{15}$	peta	P
$1.000.000.000.000.000.000 = 10^{18}$	exa	E

Tabella III **Grandezze importanti**

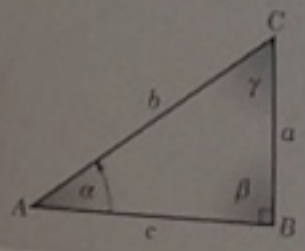
Accelerazione di gravità	$9{,}81\ m/s^2$
Massa volumica dell'acqua (a 4 °C)	$1000\ kg/m^3 = 1{,}0\ Mg/m^3$
Pressione atmosferica standard al livello del mare	$101{,}32\ kN/m^2 = 101{,}32\ kPa$
Massa volumica dell'acciaio	$7850\ kg/m^3 = 7{,}85\ Mg/m^3$
Modulo di elasticità dell'acciaio	$206.000\ N/mm^2 = 206.000\ MPa = 206\ GPa$
Massa volumica dell'aria (a 0 °C e 101,32 kPa)	$1{,}29\ kg/m^3$
Velocità del suono nell'aria (a 20 °C)	343 m/s

Aria standard

	Azoto [%]	*Ossigeno* [%]	*Azoto/Ossigeno*	*Aria/Ossigeno*
Volume	79,0	21,0	3,76	4,76
Massa	76,8	23,2	3,31	4,31

Umidità specifica: x = 0,013 kg di acqua/kg di aria secca
Massa molare equivalente $M = 28{,}97\ kg/kmol \sim 29\ kg/kmol$
Massa volumica (0 °C e 101,32 kPa) = $1{,}29\ kg/m^3$

Tabella IV **Formule di base del triangolo rettangolo**



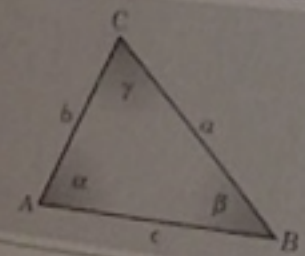
Teorema di Pitagora: $b^2 = a^2 + c^2$

Seno dell'angolo α: $\sin\alpha = \frac{a}{b}$

Coseno dell'angolo α: $\cos\alpha = \frac{c}{b}$

Tangente dell'angolo α: $\tan\alpha = \frac{a}{c}$

Tabella V **Formule di base del triangolo qualunque**



Teorema del coseno (o di Carnot): $b^2 = a^2 + c^2 - 2ac\cos\beta$

Teorema dei seni (o di Eulero): $\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} = \frac{c}{\sin}$