$$\ddot{x}_c = \frac{v}{r}\dot{y}_c = +\frac{v^3}{r^2}t - \frac{v^2}{r^2}x_c$$

Risolvo $\Rightarrow$ $x_c = x_c$ (omogenea) + x_c (particolare)

$$x_c(\text{om}) = A \sin\left(\frac{v}{r}t + \varphi\right)$$

$$x_c(\text{part}) = vt$$

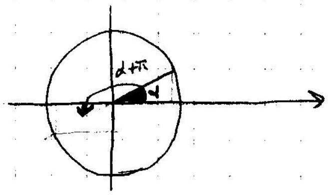
$$\Rightarrow \begin{cases} x_c(t) = vt + A\sin\left(\frac{v}{r}t+\varphi\right) \\ \dot{x}_c(t) = v + A\frac{v}{r}\cos\left(\frac{v}{r}t+\varphi\right) \end{cases} \qquad (3)$$

dalla prima di (2)

$$\begin{cases} y_c(t) = r + A\cos\left(\frac{v}{r}t+\varphi\right) \\ \dot{y}_c(t) = -A\frac{v}{r}\sin\left(\frac{v}{r}t+\varphi\right) \end{cases} \qquad (4)$$

Le cond. al contorno danno

$$\begin{cases} A\sin\varphi = 0 \\ v + A\frac{v}{r}\cos\varphi = 0 \end{cases} \qquad \begin{cases} r + A\cos\varphi = 0 \\ -A\frac{v}{r}\sin\varphi = 0 \end{cases}$$



Soluzioni $\begin{cases} \varphi = 0 \; ; \; A = -r \\ \varphi = \pi \; ; \; A = r \end{cases}$

$$\begin{cases} \cos(\alpha+\pi) = -\cos\alpha \\ \sin(\alpha+\pi) = -\sin\alpha \end{cases} \longrightarrow$$

$$\begin{cases} x_c(t) = vt - r\sin\left(\frac{v}{r}t\right) \\ y_c(t) = r - r\cos\left(\frac{v}{r}t\right) \end{cases}$$