Δίλεπτο 17 (συνέχεια)

$$\sqrt{1+y'^2} - \frac{(y')^2}{\sqrt{1+y'^2}} = C\sqrt{y_1 - y}$$

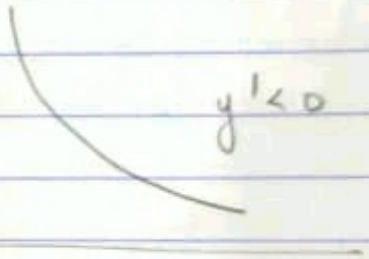
$$\frac{\sqrt{1+y'^2}}{} - \frac{(y')^2+1-1}{\sqrt{1+(y')^2}} = C\sqrt{y_1-y}$$

$$\sqrt{1+y'^2} - \sqrt{1+y'^2} - \frac{1}{\sqrt{1+y'^2}} = C\sqrt{y_1-y}$$

$$1+y'^2 = \frac{1}{C^2(y_1-y)}$$

$$y'^2 = \frac{1-C^2(y_1-y)}{C^2(y_1-y)}$$

$$|y'| = \frac{\sqrt{1-C^2(y_1-y)}}{C\sqrt{y_1-y}}$$



$$-\frac{dx}{dy} = \frac{C\sqrt{y_1-y}}{\sqrt{C_1-(y_1-y)}} \qquad C_1 = C^{-2}$$

$$\frac{C}{\sqrt{C_1}} =$$

$$dx = \frac{C\sqrt{y_1-y}}{\sqrt{C_1-(y_1-y)}}\,dy = \frac{C_1 C\sqrt{C_1}\sin^2\frac{\varphi}{2}}{C_1\sqrt{\cos^2\frac{\varphi}{2}}}\cos\frac{\varphi}{2}\,d\varphi$$

$$y_1 - y = C_1\sin^2\frac{\varphi}{2}$$

$$dy = C_1 \sin\frac{\varphi}{2}\cos\frac{\varphi}{2}$$

$$= \frac{C_1}{2}\sin^2\frac{\varphi}{2}\,d\varphi = \frac{C_1}{2}(1-\cos\varphi)\,d\varphi$$

$\Rightarrow$

$$\begin{cases} x = \frac{c_1}{2}(\varphi - \sin\varphi) + c_2 \\ y = y_1 - \frac{c_1}{2}(1 - \cos\varphi) \end{cases}$$

Циклоида.

□