

$$F'(\theta) = \theta \cos(\theta + \alpha)$$

$$F'(\theta) = 0 \text{ のとき, } \theta = 0, \theta + \alpha = \frac{\pi}{2}$$

θ	0	...	$-\alpha + \frac{\pi}{2}$...	$\frac{\pi}{2}$
$F'(\theta)$	0	+	0	-	
$F(\theta)$	0	↗	$-\alpha - \cos\alpha + \frac{\pi}{2}$	↘	

Fの増減表は左表のようになります。

よって、最大値は $-\alpha - \cos\alpha + \frac{\pi}{2}$

$$\begin{aligned} \text{※ } F(-\alpha + \frac{\pi}{2}) &= \int_0^{-\alpha + \frac{\pi}{2}} x \{A_m'(x+\alpha)\}' dx = \left[x A_m'(x+\alpha) \right]_0^{-\alpha + \frac{\pi}{2}} - \int_0^{-\alpha + \frac{\pi}{2}} A_m'(x+\alpha) dx \\ &= -\alpha + \frac{\pi}{2} + \left[\cos(x+\alpha) \right]_0^{-\alpha + \frac{\pi}{2}} = -\alpha - \cos\alpha + \frac{\pi}{2} \end{aligned}$$