ADJEROH PRINCEWILL EZECHINYERE

18/ENG05/006

MECHATRONICS ENGINEERING

$5x^2+y^2=5$ --(i)

$x^2+y^2=4$ --(ii)

To calculate angle between them, ~~substitute~~ make y^2 Subject of formular in (ii)

$y^2=4-x^2$ --(iii)

put (iii) in (i).

$5x^2+(4-x^2)=5$

$5x^2+4-x^2=5$

$5x^2-x^2=5-4$

$4x^2=1$

$x^2=\frac{1}{4}$, $x=\pm\sqrt{\frac{1}{4}}=\pm\frac{1}{2}$

$x_1=+1/2$, $x_2=+1/2$

Make y^2 Subject of formular in (i),

$y^2=5-5x^2$ --(iv)

Put (iv) to i

Put $x=\pm 2$ in ii

Make y^2 Subject of formular in (i),

$y^2=5-5x^2$ --(iv)

Put $x=\pm\frac{1}{2}$ in (iv)

$y^2=5-5(\pm 1/2)^2$

$y=\sqrt{5-5(\pm 1/2)^2}$

$y_1=\sqrt{5-5(-1/2)^2}$

$=1.94$

$y_2=\sqrt{5-5(1/2)^2}$

$=1.94$

$5x^2+y^2=5$

$10x+2y\frac{dy}{dx}=0$

$2y\frac{dy}{dx}=-10x$

$\frac{dy}{dx}=\frac{-10x}{2y}$

$\frac{dy}{dx}=\frac{-10(1/2)}{2(1.94)}=-1.29$

$\frac{dy}{dx}=\tan\theta_1=-1.29$

$\tan\theta_1=-1.29$

$\theta_1=\tan^{-1}-1.29$

$\theta_1=-52.22^\circ$ //

$x^2+y^2=4$

$2x+2y\frac{dy}{dx}=0$

$2y\frac{dy}{dx}=-2x$

$\frac{dy}{dx}=\frac{-2x}{2y}=\frac{-x}{y}$

$\frac{dy}{dx}=\frac{-(-1/2)}{(1.94)}=-0.26$

$\frac{dy}{dx}=\tan\theta_2=-0.26$

$\tan\theta_2=-0.26$

$\theta_2=\tan^{-1}-0.26$

$\theta_2=-14.57$ //

Total angle between them;

$\theta_2-\theta_1$,

$-14.57-(-52.22)$

$=37.65^\circ$

Mathcad Professional - [ENG 281 assignment]

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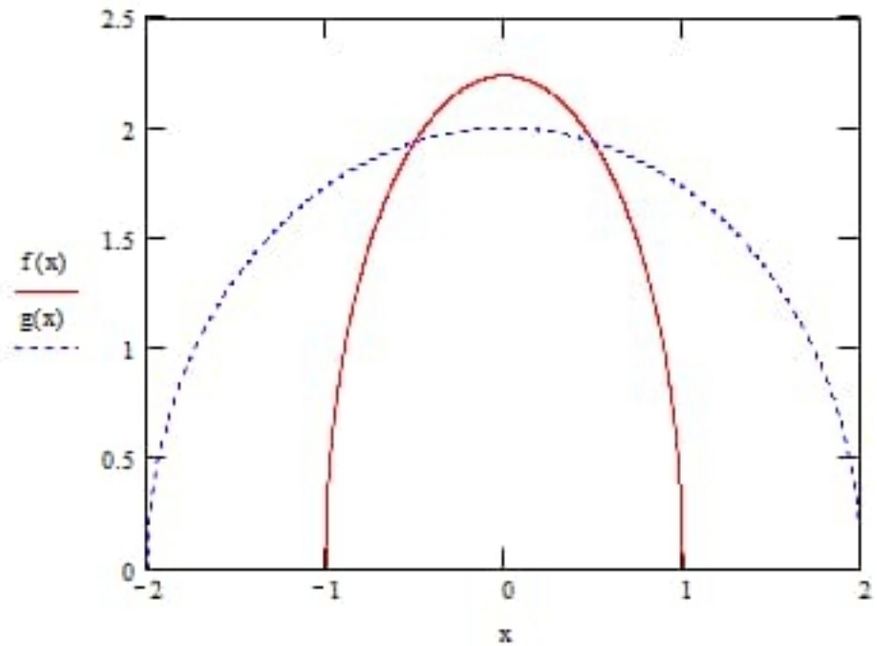
$$f(x) := \sqrt{5 - 5x^2} \qquad g(x) := \sqrt{4 - x^2}$$



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