

RAJI UMMI-SALMA ONIZE

18/ENG08/020

BIO MEDICAL ENGINEERING

ENG 281

ASSIGNMENT

By plotting the curves given in equations (1) & (2) to show the angles between them at their points of intersections with the aid of MATCAD. Find the magnitude of the angle for which x and y are positive

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

$$x^2 + y^2 = 4$$

Soln.

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

$$x^2 + y^2 = 4$$

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

$$4x^2 = 1$$

$$x^2 = \frac{1}{4}$$

$$x = \sqrt{\frac{1}{4}}$$

$$x = 0.5$$

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

$$5(0.5)^2 + y^2 = 5$$

$$1.25 + y^2 = 5$$

$$y^2 = 5 - 1.25$$

$$y^2 = 3.75$$

$$y = \sqrt{3.75}$$

$$y = 1.94$$

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

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

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

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

$$\frac{dy}{dx} = -\frac{5x}{y}$$

$$\frac{dy}{dx} = \tan \theta$$

$$-\frac{5x}{y} = \tan \theta$$

$$\frac{-5(0.5)}{1.94} = \tan \theta$$

$$\theta = -52.19^\circ$$

$$x^2 + y^2 = 4$$

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

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

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

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

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

$$\frac{dy}{dx} = \tan \theta$$

$$= \frac{-0.5}{1.94} = \tan \theta$$

$$\theta = -14.45^\circ$$

$$\therefore \theta_2 - \theta_1 = (-14.45^\circ) - (-52.19^\circ)$$

$$= 37.74^\circ$$