Ajibade Pheroz Toluwanimi
MAT102
Dr Okunlola
Mechatronics Department
19/ENG05/007

① Find the equation of the tangent at the point (1,0) on the curve $2x^2+y^2-5x-y+4=0$

Solution

Compare the equation to $x^2+y^2+2gx+2fy+c=0$

$2gx = -5x$ $\quad c = 4$ from equation

$g = \frac{-5x}{2x} = -5/2$

$2fy = -y$

$f = \frac{-y}{2y} = -1/2$

The equation of the tangent at $(1,0)$ is

$xx_1 + yy_1 + 2gx_1 + 2fy_1 + c = 0$

$xx_1 + yy_1 - 5/2(x+x_1) - 1/2(y+y_1) + c = 0$

$x(1) + y(0) - 5/2(x+1) - 1/2(y+0) + 4$

$x + 0 - 5/2x - 5/2 - 1/2y(-1/2 \times 0)$

$x + 0 - 5/2x - 5/2 - 1/2y + 4 = 0$

$-3/2x - 1/2y - 5/2 + 4$ $\quad -3/2x - 1/2y - 5/2 + 4 = 0$

multiply by 2 $\quad$ multiply by 2

$-3x - y - 3 + 8 = 0$

$-3x - y + 13 = 0$

$y = -3x + 13$

2 Find the equation of the Tangent at the point $(1,0)$ on the Circle $x^2+y^2-12x-12y+47=0$

Solution

From the equation above

$2gx = -12x \qquad C = 47$

$g = \frac{-12x}{2x} = -6$

$2fy = -12y$

$f = \frac{-12y}{2y} = -6$

Using $xx_1 + yy_1 + g(x+x_1) + f(y+y_1) + c = 0$

$x(1) + y(0) + g(x+(1)) + f(y+(0)) + 47 = 0$

$x + (-6)(x+1) + (-6)(y) + 47 = 0$

$x - 6x - 6 - 6y + 47 = 0$

$-5x - 6y + 41 = 0$

$y = \frac{-5x}{-6} + \frac{41}{-6}$

$y = -5/6\,x + 41/6$

3 Find the equation of the tangent at the point (1, 0) on the circle $x^2 + y^2 - 8x + 14y + 40 = 0$

Solution

From the equation

$2gx = -8x \qquad C = 40$

$g = \frac{-8x}{2x} = -4$

$2fy = 14y$

$f = \frac{14y}{2y} = 7$

Using

$xx_1 + yy_1 + g(x + x_1) + f(y + y_1) + C = 0$

$x(1) + y(0) + [-4(x + 1)] + [7(y + 0)] + 40 = 0$

$x + [-4x - 4] + [7y] + 40 = 0$

$x - 4x - 4 + 7y + 40 = 0$

$-3x + 7y + 36 = 0$

$7y = 3x - 36$

$y = \frac{3}{7}x - \frac{36}{7}$