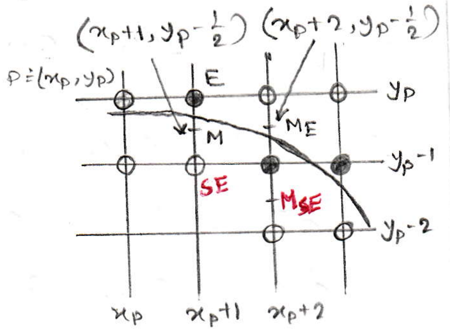
We know,

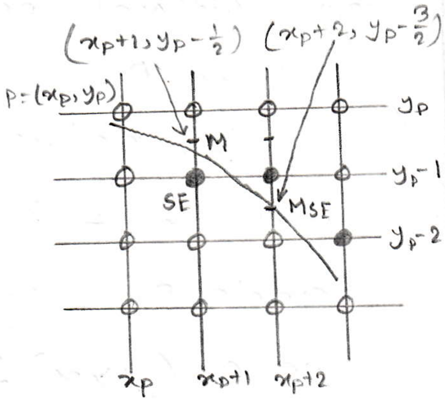
Circle equation, $(x-h)^2+(y-k)^2 = R^2$

$$\Rightarrow (x-0)^2+(y-0)^2 = R^2 \quad [\text{if centre is } (0,0)]$$

$$\therefore x^2+y^2-R^2=0$$



If dinit <=0



If dinit >0

$$\therefore F(x,y) = x^2+y^2-R^2$$

$$\therefore F(P) = F(x_p, y_p)$$
$$= x_p^2+y_p^2-R^2$$

$$\therefore F(M) = F\left(x_p+1, y_p-\frac{1}{2}\right)$$
$$= (x_p+1)^2+\left(y_p-\frac{1}{2}\right)^2-R^2$$

$$\therefore F(M_E) = F\left(x_p+2, y_p-\frac{1}{2}\right)$$
$$= (x_p+2)^2+\left(y_p-\frac{1}{2}\right)^2-R^2$$

$$\therefore F(M_{SE}) = F\left(x_p+2, y_p-\frac{3}{2}\right)$$
$$= (x_p+2)^2+\left(y_p-\frac{3}{2}\right)^2-R^2$$

Now,

$$\text{dinit} = F(M)-F(P)$$
$$= (x_p+1)^2+\left(y_p-\frac{1}{2}\right)^2-R^2-x_p^2-y_p^2+R^2$$
$$= x_p^2+2x_p+1+y_p^2-y_p+\frac{1}{4}-x_p^2-y_p^2$$
$$= 2x_p-y_p+\frac{5}{4}$$

$$\therefore d_E = F(M_E)-F(M)$$
$$= (x_p+2)^2+\left(y_p-\frac{1}{2}\right)^2-R^2-(x_p+1)^2-\left(y_p-\frac{1}{2}\right)^2+R^2$$
$$= x_p^2+4x_p+4-x_p^2-2x_p-1$$
$$= 2x_p+3$$