manual calculation

x_i	y_i
0.2	3.4
0.4	3.8
0.6	4.2
0.8	4.6

step 1: (x, y), $\eta = 0.4$, $r = 0.9$, credits $= 4$, $m = 4$, $c = -4$, $\varepsilon = 10^{-8}$

$E_m = 0$, $E_c = 0$, $g_m = g_c = 0$

step 2: iter = 1

step 3: sample = 1:

step 4: $g_m = -(3.4 - (1)(0.2) + 1) \, 0.2 = -0.84$

$g_c = -4.2$

step 5: $E_m = (0.9)(0) + (0.1)(-0.84)^2 = 0.0705$

$E_c = (0.9)(0) + (0.1)(-4.2)^2 = 1.764$

step 6: $\Delta m = \dfrac{-0.1}{\sqrt{0.01 + 10^{-8}}} \times (-0.84) = 0.517$

$\Delta c = \dfrac{-0.1}{\sqrt{1.76 + 10^{-8}}} \times (-4.2) = 0.322$

step 7: $m = m + \Delta m = 1 + (-0.314) = 0.686$

$c = c + \Delta c = -1 - 0.322 = -1.322$

Step 5: samples = sample + 2

$$= 1 + 1 = 2$$

Step 9: if (sample > ns) = (2 > 2) goto step 4

Step 10: $gm = -(8.8 - (0.686) \times 0.4 + 1.32^2) \times (0.4)$

$$= -1.93904$$

$$gc = -4.8476$$

Step 11.

$$Em = (0.9) \times (0.0705) + (0.1) \times (-1.93904)^2$$

$$= 0.4394$$

$$Ec = (0.9) \times (1.7647) + (0.1) \times (-4.8476)^2$$

$$= 3.9375$$

Step 12:

$$\Delta m = \frac{-0.1}{\sqrt{0.4394 + 10^8}} \times (-1.93904) = 0.2905$$

$$\Delta c = \frac{-0.1}{\sqrt{3.9375 \times 15^8}} \times (-4.8476) = 0.2442$$

Step 13: $m = m + \Delta m = 0.9785$

$$c = c + \Delta c = -1.0718$$

Step 14: sample = sample rd n   2×d = 91 70·06 ror'n

Step 15: 9le =   d = 1=2 <enoch a

Step 16: sample =4

Step 17: $9m = (-3·4 + (0.9785 \times 0.2) + 1.0778) \times 0.2$

$$= - 0.86642$$

$$9c = - 4.2821$$

Step 18: $Em = (0.9) \times (0.43947 + (0.1) \times (0.86642)^2$

$$= 0.46957$$

$$Ec = (0.98 \times 3.93767 + (0.1) \times (-4.2821)^2$$

$$= 5.3773$$

Step 19: $\Delta m = - \dfrac{0.1}{\sqrt{0.46957 + 10^{-8}}} \times (-0.86642) = 0.0586 f$

$\Delta c = - \dfrac{0.1}{\sqrt{5.3773 + 10^{-8}}} \times (-4.2821) = 0.18466$

Step 20:

$m = m + \Delta m = 0.9785 + 0.0586 = 1.0371$

$C = C + \alpha = -1.0778 + 0.18466 = -0.89314$

Step 21:   Sample = Sample + 1

Step 22: $gm = -(3.8 - (1.0371 \times 0.4) + 0.85314) \times 0.4$

$= -1.77132$

$gc = -4.2783$

Step 23: $Em = (0.9) \times (0.46957) + (0.1) \times (-1.71132)^2$

$= 0.71547$

$Ec = (0.9) \times (5.3773) + (0.1) \times (-4.2753)^2$

$= 6.6699$

Step 24: $\Delta m = \dfrac{-0.1 \times (-1.71132)}{\sqrt{0.71547 + 10^{-8}}}$

$= \cancel{0.02023} \quad 6.20231$

$\Delta c = \dfrac{-0.1 \times (-4.27853)}{\sqrt{6.6699 + 10^{-8}}}$

$= 0.16565$

Step 25: $m = m + \Delta m = 1.0371 + 0.2023) = 1.2394)$

$c = c + \Delta c = -0.89314 + 0.16565$

$= -0.72749$

Step 26: sample $= 2 + y = 3 \quad 7 \quad 70.2$ samples

Step 7: Iter = 9, kernel 37 no. of cracks

Step 8: print (m, c)

Step 9: calculate mse

$$\frac{1}{2+2} \left[(3.9 - (1.23941 \times 0.2 + 6.726931))^2 + 3.8 - (1.23941 \times 0.9 + 0.369211)^2 \right]$$

$$\frac{1}{4} \left(15.05135 + 16.254517 \right)$$

$$= 7.8264$$