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Batch-A

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CG Tutorial - 1

1. (10, 20) and (20, 16)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{16 - 20}{20 - 16} = -4/10 = 0.4$$

$|m| < 1$ and slope is -ve

$\therefore x_{k+1} = x_k + 1 \; ; \; y_{k+1} = y_k + m$

$(x_0, y_0) = (10, 20)$

$x_1 = x_0 + 1 \; ; \; y_1 = y_0 + m$

$= 10 + 1 \; ; \; = 20 - 0.4$

$= 11 \; ; \; = 19.6 \sim 20$

$(x_1, y_1) = (11, 20)$

$(x_2, y_2) = (11+1, 19.6 - 0.4) \simeq (12, 19)$

$(x_3, y_3) = (12+1, 19.2 - 0.4) \simeq (13, 19)$

$(x_4, y_4) = (13+1, 18.8 - 0.4) \simeq (14, 18)$

$(x_5, y_5) = (14+1, 18.4 - 0.4) \simeq (15, 18)$

$(x_6, y_6) = (15+1, 18 - 0.4) \simeq (16, 18)$

$(x_7, y_7) = (16+1, 17.6 - 0.4) \simeq (17, 17)$

$(x_8, y_8) = (17+1, 17.2 - 0.4) \simeq (18, 17)$

$(x_9, y_9) = (18+1, 16.8 - 0.4) \simeq (19, 16)$

$(x_{10}, y_{10}) = (19+1, 16.4 - 0.4) \simeq (20, 16)$

$\therefore$ The Points obtained between the endpoints

(11, 20), (12, 19), (13, 19), (14, 18), (15, 18), (16, 18), (17, 17)
(18, 17), (19, 16)

2. (12, 13) and (18, 20)

$$m = \frac{20 - 13}{18 - 12} = 7/3 = 2.33$$

$|m| > 1$ and slope is +ve

$\therefore x_{k+1} = x_k + 1/m \; ; \; y_{k+1} = y_k + 1$

$(x_0, y_0) = (12, 13)$

$x_1 = x_0 + 1/m = 12 + 1/2.33 \qquad y_1 = y_0 + 1 = 13 + 1 = 14.$

$= 12 + 0.429 = 12.429 \simeq 12$

$\therefore (x_1, y_1) = (12, 14)$

$(x_2, y_2) = (12 \cdot 43 + 0 \cdot 43, 14+1) = (12 \cdot 86, 15) = (13, 15)$

$(x_3, y_3) = (12 \cdot 86 + 0 \cdot 43, 15+1) = (13, 16)$

$(x_4, y_4) = (13 \cdot 29 + 0 \cdot 43, 16+1) = (14, 18)$

$(x_5, y_5) = (13 \cdot 72 + 0 \cdot 43, 17+1) = (14, 18)$

$(x_6, y_6) = (14 \cdot 15 + 0 \cdot 43, 18+1) = (14 \cdot 58, 19) = (15, 19)$

$(x_7, y_7) = (14 \cdot 58 + 0 \cdot 43, 19+1) = (15 \cdot 01, 20) = (15, 20)$

$\therefore$ The points obtained between the given endpoints are:
$(12,14), (13,15), (14,18), (14,18), (15,19)$

3. $(20, 7)$ and $(16, 11)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{11 - 7}{16 - 20} = \frac{-4}{4} = -1$$

Slope is -ve and $|m| = 1$

$\therefore x_{k+1} = x_k - 1 \quad ; \quad y_{k+1} = y_k - m$

$(x_0, y_0) = (20, 8)$

$x_1 = x_0 - 1 = 20 - 1 = 19 \quad ; \quad y_{01} = y_0 - m = 7 - (-1) = 8$

$(x_1, y_1) = (19, 8)$

$(x_2, y_2) = (19-1, 8+1) = (18, 9)$

$(x_3 y_3) = (17, 10)$

$(x_4, y_4) = (16, 11)$

$\therefore$ The Points obtained between the given endpoints are
$(20, 8), (19, 9), (18, 10), (16, 11)$