Unit 4 : Curve Fitting

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(1) For straight line these are normal eqn by Least Square Approximation.

→ $y = ax + b$:

$$a\Sigma x^2 + b\Sigma x = \Sigma xy$$

$$a\Sigma x + bn = \Sigma y$$

→ $x = ay + b$:

$$a\Sigma y^2 + b\Sigma y = \Sigma xy$$

$$a\Sigma y + bn = \Sigma x$$

(2) Normal eqn for parabola

$$y = ax^2 + bx + c$$

$$a\Sigma x^4 + b\Sigma x^3 + c\Sigma x^2 = \Sigma x^2 y$$

$$a\Sigma x^3 + b\Sigma x^2 + c\Sigma x = \Sigma xy$$

$$a\Sigma x^2 + b\Sigma x + cn = \Sigma y$$

(3) Non - Polynomial

(i) $y = ae^{bx}$ (Exponential curve)

$\log y = Y \quad \log a = A$

$$\boxed{Y = A + bx}$$

$$\Sigma xY = A\Sigma x + b\Sigma x^2$$
$$\Sigma Y = An + b\Sigma x$$

(ii) $y = ax^b$ (Geometric curve)

$\log_e y = Y \quad \log a = A \quad \log x = X$

$$\boxed{Y = A + bX}$$

$$b\Sigma X^2 + A\Sigma X = \Sigma XY$$
$$b\Sigma X + An = \Sigma X$$

(iii) $y = ab^x$ (Power curve)

$\log y = Y \quad \log a = A \quad \log b = B$

$$\boxed{Y = A + Bx}$$

$Y = A + Bx$

$$B\Sigma x^2 + A\Sigma x = \Sigma xY$$

$$B\Sigma x + An = \Sigma Y$$