Formulas — U-2

The first moment about mean always zero $\mu_1 = 0$

1) $\mu_1 = 0$
2) $\mu_2 = \mu_2' - (\mu_1')^2$
3) $\mu_3 = \mu_3' - 3\mu_2\mu_1' + 2(\mu_1')^3$
4) $\mu_4 = \mu_4' - 4\mu_3'\mu_1' + 6\mu_6'(\mu_1')^2 - 3(\mu_1')^4$

Skewness

→ literally skewness means lack of symmetry. We study skewness to have an idea about to shape of the curve which we can draw with the help of the given data

$$\beta_1 = \frac{\mu_3^2}{\mu_2^3}$$

$$\beta_2 = \frac{\mu_4}{\mu_2^2}$$

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1) $\bar{x} = \frac{\Sigma x_i}{N}$

$$\mu_r = \frac{1}{N}\Sigma(x_i - \bar{x})$$

→ if f is the data

x_i	0	1	2	3	4
f_i	1	8	28	—	—

$N = 4$

$$\bar{x} = \frac{\Sigma x_i}{N} = \frac{36}{9} = 4$$

$$\mu_r = \frac{1}{\Sigma f_i} \Sigma f_i (x_i - \bar{x})$$

Binomial distribution

$$P(r) = {}^nC_r\, p^r q^{n-r}, \quad r = 0, 1, 2, \ldots$$

Mean = $\mu = np$

Variance $= \sigma^2 = E(x)^2 - \mu^2$

$$\sigma^2 = npq$$

if) $P(x \geq 7)$

→ $P(x = 7) + P(x = 8) + P(x = 9)$

${}^nC_7\, p^7\, q^{n-7} +$

p^7 — success, q^{n-7} — failure

Poisson

$$P(X=x) = \frac{e^{-\lambda} \lambda^x}{x!}$$

$$\lambda = np$$

Poisson $\approx$ Binomial