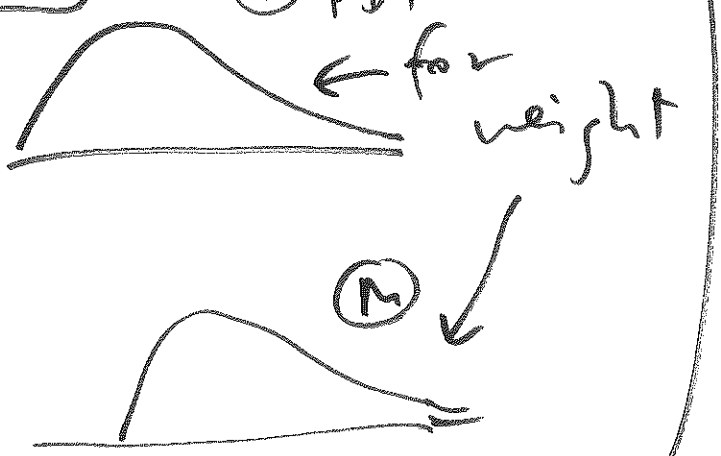
Disc. Sec. 9

London underground case study (continued)

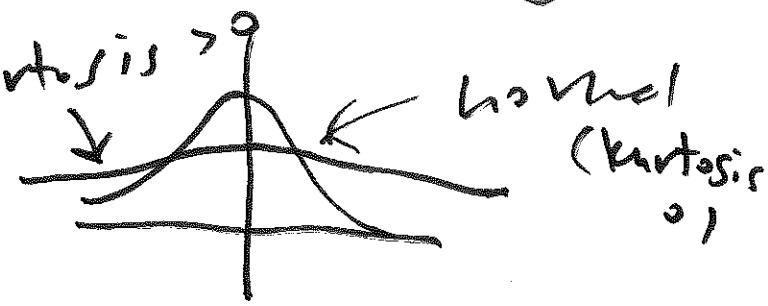


$E(\bar{X}) = \mu, \quad V(\bar{X}) = \sigma^2$

$$\text{skewness}(\bar{X}) = E\left[\left(\frac{\bar{X} - \mu}{\sigma}\right)^3\right]$$

$$\text{kurtosis}(\bar{X}) = E\left[\left(\frac{\bar{X} - \mu}{\sigma}\right)^4\right] - 3$$

↑ heaviness of tails



$$\text{skewness}(\bar{X}_n) = \frac{\text{skewness}(X_1)}{\sqrt{n}}$$

$$\text{kurtosis}(\bar{X}_n) = \frac{\text{kurtosis}(X_1)}{n}$$

$$\text{skewness}(\bar{X}_n) = \frac{\text{skewness}(X_1)}{\sqrt{n}}$$

set $|\text{skewness}(\bar{X}_n)| = \boxed{0.1} \rightarrow n_s$

& $|\text{kurtosis}(\bar{X}_n)| = \boxed{0.1} \rightarrow n_k$

& solve for n : desired n for good CLT

is $\max(n_s, n_k)$

$$\boxed{n_s = 100\,\text{skewness}(X_1)^2} \quad (87)$$

$$\boxed{n_k = 10\,\text{kurtosis}(X_1)} \quad (10)$$