Section 1.5: Tchebysheff and the Empirical Rule

Thursday, January 11, 2018 1:04 PM

or Chebyshev

Tchebysheff's theorem - works for all distributions

(symmetrical or skewed, unimodal or multimodal)

- for any set of measurements, at least $(1 - 1/k^2)$ of the measurements will lie within k standard deviations of the mean for $k \geq 1$

k	$1 - 1/k^2$
1	0
1.5	$5/9$
2	$3/4$
2.5	$21/25$
3	$8/9$

totally useless statement

so $\geq 0\%$ i.e. within $\mu \pm 1\sigma$

$\geq 55.\overline{5}\%$ $\mu \pm 1.5\sigma$

$\geq 75\%$ $\mu \pm 2\sigma$

$\geq 84\%$ $\mu \pm 2.5\sigma$

$\geq 88.8\%$ $\mu \pm 3\sigma$

---

the Empirical Rule: only works for "mound-shaped" data sets

mound-shaped: unimodal and roughly symmetrical

approximately 68% of measurements fall within $\mu \pm 1\sigma$
" 95% $\mu \pm 2\sigma$
" 99.7% $\mu \pm 3\sigma$

$\bar{x} \pm 3s$ for samples