§2.2.1 Average deviation and standard deviation

Ⅰ、Terms of Titrimetric Analysis

1.Average deviation

Average deviation is also called as average deviation of the mean. It's usually used to express the precision of a set of data and calculated by the following equation:

$$\bar{d} = \frac{\sum |X - \bar{X}|}{n}$$

xi ----- the experimental value; --- mean of the experimental values; n--- the number of measurements.

Characteristics: simple, but it can not embody the great deviation

Ⅱ.Standard deviation

The calculation of the standard deviation is classified by the following equations:

1. $$\sigma = \sqrt{\frac{\sum (X - \mu)^2}{n}}$$

2.when the number of measurements is close to finite:

$$s = \sqrt{\frac{\sum (X - \bar{X})^2}{n-1}}$$

Relative standard deviation is Standard deviation is more accurate and scientific than average deviation.

For example: the two sets of data

1). $X - X$: 0.11, −0.73, 0.24, 0.51, −0.14, 0.00, 0.30, −0.21

n = 8; $d1$ = 0.28; $S1$ = 0.38

2). $X-X$: 0.18, 0.26, −0.25, −0.37, 0.32 , −0.28, 0.31, −0.27

n = 8; $d2$ = 0.28; $S2$ = 0.29

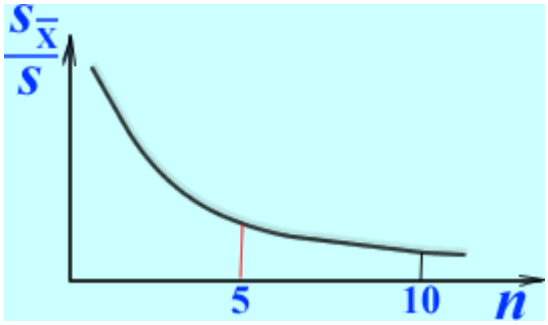
so: $d1$ = $d2$,? $S1>S2$

Ⅲ.The standard deviation of the mean

For example, for the m sets of the data, and the replicate number of each set of data is n,

$S_{\bar{x}} = \frac{S}{\sqrt{n}}$ Sx----- standard deviation of the m sets of data; S---- standard deviation of the n experimental value

The ---*n* curve is



It may be seen from the--*n* curve,

when $n > 5$, the change is slow down,

when $n > 10$, the change is little.

So a 4-6 measurement time is adequate.