

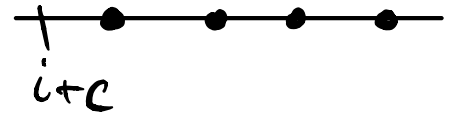
A Dataset $X := \{x_1, \dots, x_n\}$ when each element is shifted by a constant amount c is the same as the unshifted.

$$\mu = \frac{1}{N} \sum_{n=0}^N x_n$$

$$\text{var}(x) = \frac{1}{N} \sum_{n=0}^N (x_n - \mu)$$

Adding (1) to each element.

$$\begin{aligned} \mu_1 &= \frac{1}{N} \sum_{n=0}^N (x_n + 1) \\ &= \frac{1}{N} \left[\sum_{n=0}^N x_n + \sum_{n=0}^N (1) \right] \\ &= \frac{1}{N} \sum_{n=0}^N x_n + \frac{N}{N} \end{aligned}$$



$$= 1 + \frac{1}{N} \sum_{n=0}^N x_n$$

$$\text{var}_1(x) = \frac{1}{N} \sum_{n=0}^N (x_n + 1 - \mu_1)$$

$$= \frac{1}{N} \sum_{n=0}^N [x_n + 1 - (1 + \mu)]$$

$$= \frac{1}{N} \sum_{n=0}^N (x_n - \mu)$$