비복원추출한 표본의 표본평균의 평균과 분산과 표준편차

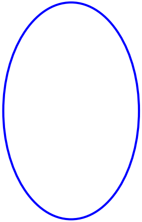
(Mean and Variance and and Standard Deviation of Sample Mean of Samples without Replacement)

Mean and Variance and and Standard Deviation of Sample Mean of Samples without Replacement

Start End

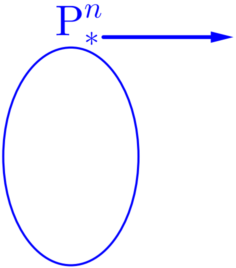
Start End

P_*^n



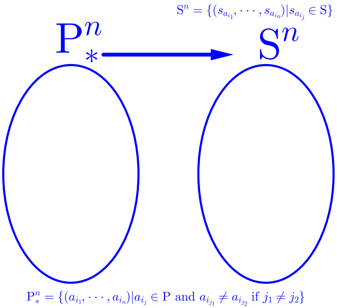
$$\mathrm{P}_*^n = \{(a_{i_1}, \cdots, a_{i_n}) | a_{i_j} \in \mathrm{P} \text{ and } a_{i_{j_1}} \neq a_{i_{j_2}} \text{ if } j_1 \neq j_2\}$$

Start End

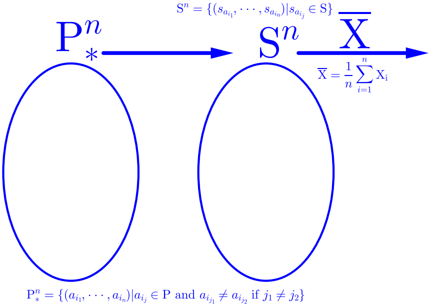


$\mathrm{P}^n_* = \{(a_{i_1}, \cdots, a_{i_n}) | a_{i_j} \in \mathrm{P} \text{ and } a_{i_{j_1}} \neq a_{i_{j_2}} \text{ if } j_1 \neq j_2\}$

Start End


$S^n = \{(s_{a_{i_1}}, \cdots, s_{a_{i_n}}) | s_{a_{i_j}} \in S\}$
P_*^n
S^n
$P_*^n = \{(a_{i_1}, \cdots, a_{i_n}) | a_{i_j} \in P \text{ and } a_{i_{j_1}} \neq a_{i_{j_2}} \text{ if } j_1 \neq j_2\}$

Start End


$S^n = \{(s_{a_{i_1}}, \cdots, s_{a_{i_n}}) | s_{a_{i_j}} \in S\}$
P^n_*
S^n
$\overline{X}$
$\overline{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$
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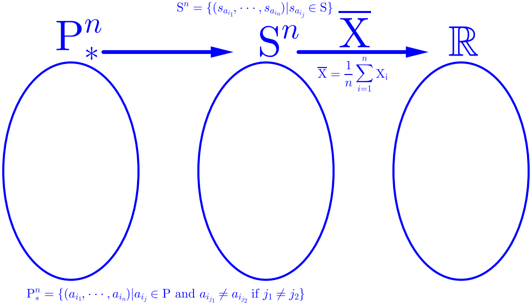
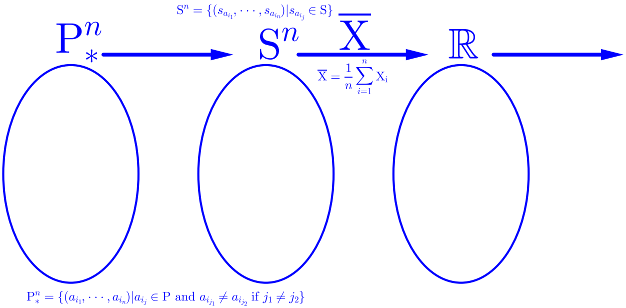
Mean and Variance and and Standard Deviation of Sample Mean of Samples without Replacement



Mean and Variance and and Standard Deviation of Sample Mean of Samples without Replacement

Start End



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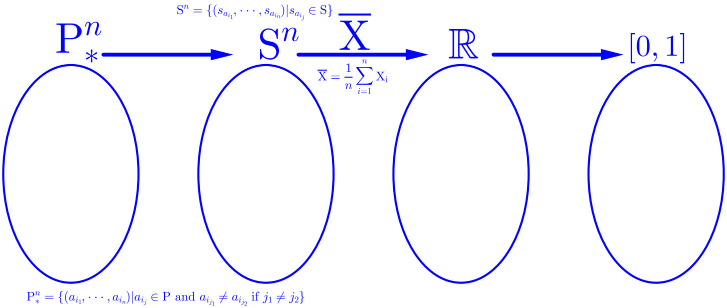
$S^n = \{(s_{a_{i_1}}, \cdots, s_{a_{i_n}}) | s_{a_{i_j}} \in S\}$
P^n_*
S^n
$\overline{X}$
$\mathbb{R}$
$[0, 1]$
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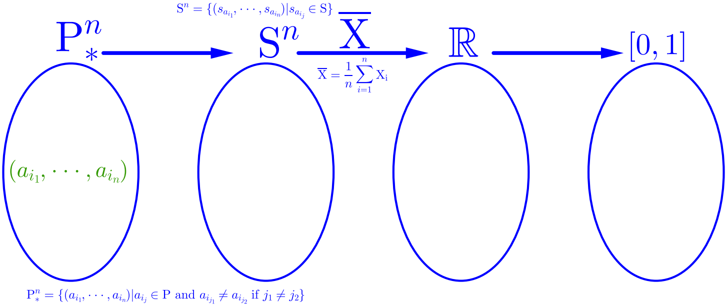
Mean and Variance and and Standard Deviation of Sample Mean of Samples without Replacement

Start End



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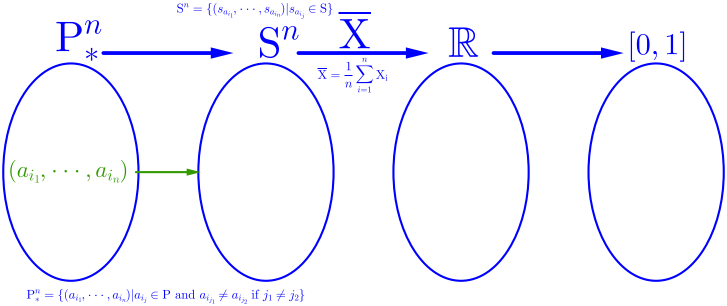
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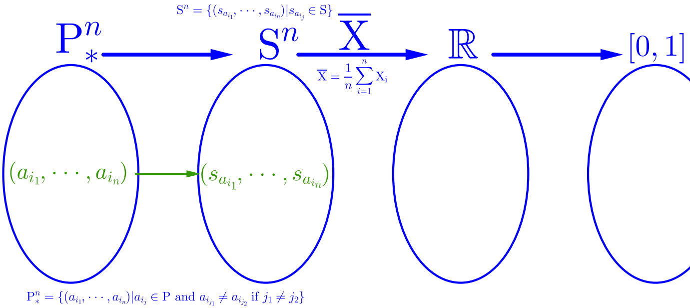
$P^n_* = \{(a_{i_1}, \cdots, a_{i_n}) | a_{i_j} \in P \text{ and } a_{i_{j_1}} \neq a_{i_{j_2}} \text{ if } j_1 \neq j_2\}$

Start End



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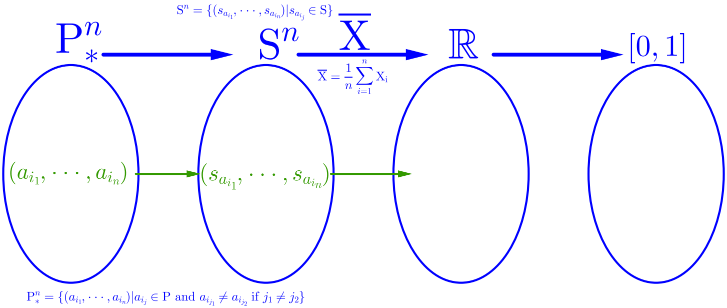
Mean and Variance and and Standard Deviation of Sample Mean of Samples without Replacement

Start End



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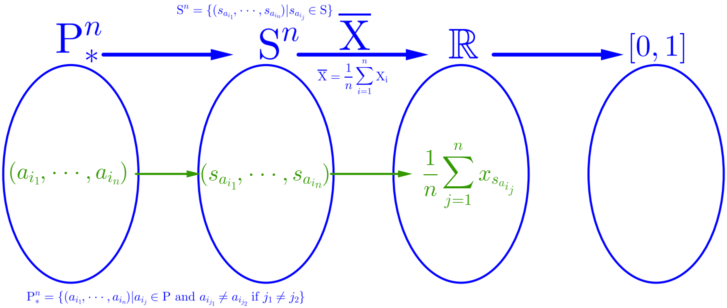
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P_*^n
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$\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}$
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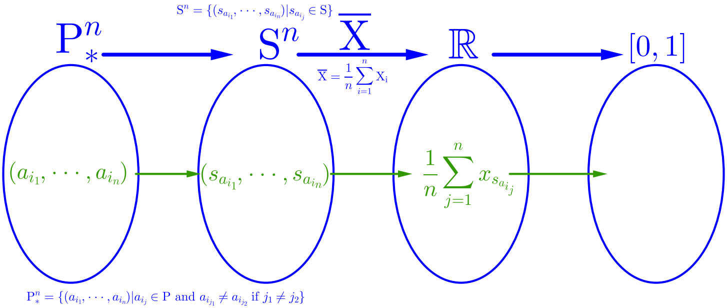
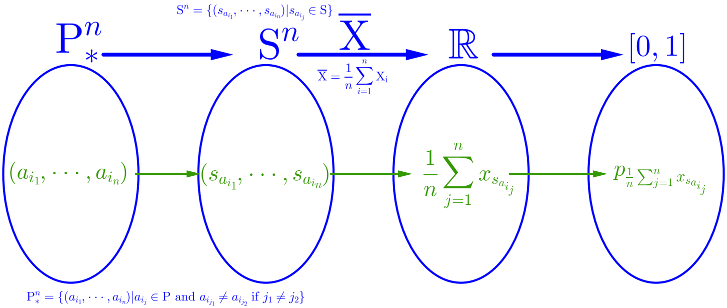
Mean and Variance and and Standard Deviation of Sample Mean of Samples without Replacement

Start End



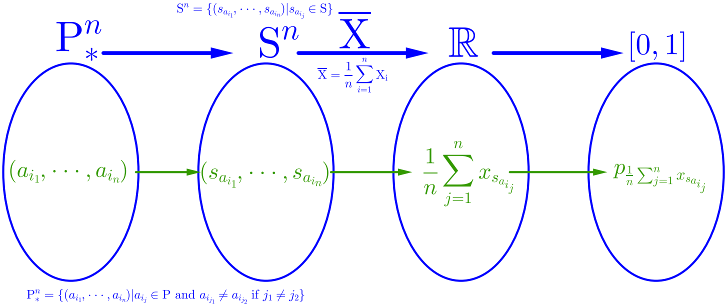
Mean and Variance and and Standard Deviation of Sample Mean of Samples without Replacement

Start End



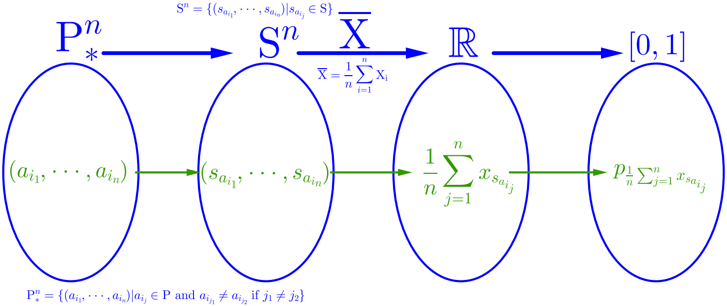
Mean and Variance and and Standard Deviation of Sample Mean of Samples without Replacement

Start End



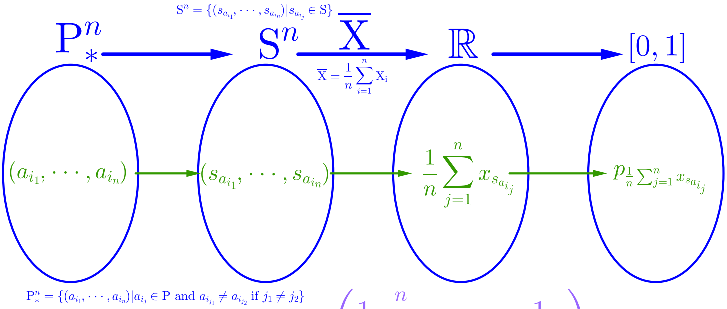
$\mathrm{E}(\overline{\mathrm{X}})$

▸ Start ▸ End



$$E(\overline{X}) = \sum_{\overline{x} \in \bigcup_{(a_{i_1}, \cdots, a_{i_n}) \in P_*^n} \left\{ \frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}} \right\}} \overline{x} \cdot p_{\overline{x}}$$

Start End



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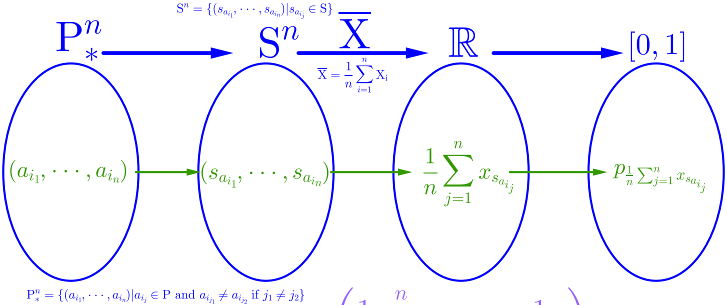
Start End

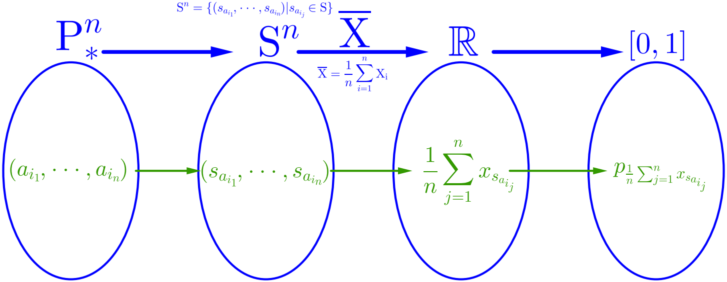


$$\mathrm{E}(\overline{\mathrm{X}}) = \sum_{\overline{x} \in \bigcup_{(a_{i_1},\cdots,a_{i_n})\in \mathrm{P}^n_*} \left\{\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}\right\}} \overline{x} \cdot p_{\overline{x}} = \sum_{(a_{i_1},\cdots,a_{i_n})\in \mathrm{P}^n_*} \left(\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}} \times \frac{1}{{}_N\mathrm{P}_n}\right)$$

$$\mathrm{E}(\overline{\mathrm{X}}^2)$$

Mean and Variance and and Standard Deviation of Sample Mean of Samples without Replacement

Start End

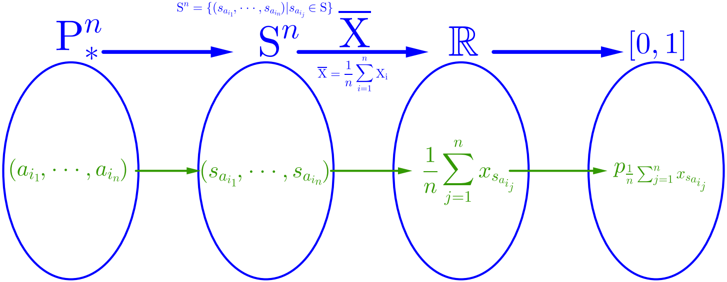


$P_*^n = \{(a_{i_1}, \cdots, a_{i_n}) | a_{i_j} \in P \text{ and } a_{i_{j_1}} \neq a_{i_{j_2}} \text{ if } j_1 \neq j_2\}$

$$E(\overline{X}) = \sum_{\overline{x} \in \bigcup_{(a_{i_1},\cdots,a_{i_n}) \in P_*^n} \left\{\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}\right\}} \overline{x} \cdot p_{\overline{x}} = \sum_{(a_{i_1},\cdots,a_{i_n}) \in P_*^n} \left(\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}} \times \frac{1}{{}_N P_n}\right)$$

$$E(\overline{X}^2) = \sum_{\overline{x} \in \bigcup_{(a_{i_1},\cdots,a_{i_n}) \in P_*^n} \left\{\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}\right\}} \overline{x}^2 \cdot p_{\overline{x}}$$

Start End



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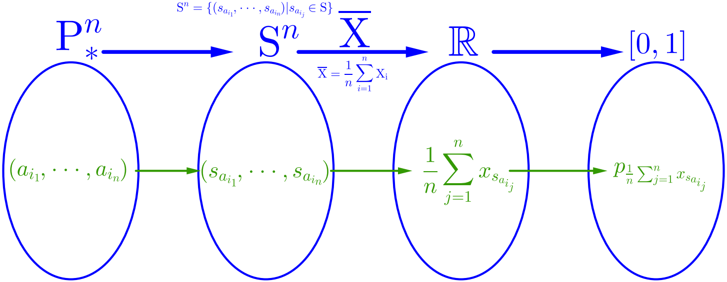
Start End



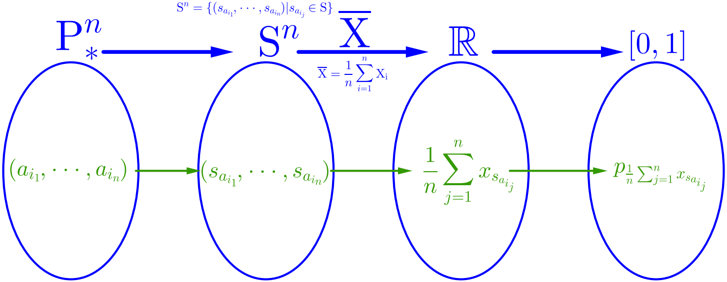
$P^n_* = \{(a_{i_1}, \cdots, a_{i_n}) | a_{i_j} \in P \text{ and } a_{i_{j_1}} \neq a_{i_{j_2}} \text{ if } j_1 \neq j_2\}$

$$E(\overline{X}) = \sum_{\overline{x} \in \bigcup_{(a_{i_1},\cdots,a_{i_n}) \in P^n_*} \left\{\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}\right\}} \overline{x} \cdot p_{\overline{x}} = \sum_{(a_{i_1},\cdots,a_{i_n}) \in P^n_*} \left(\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}} \times \frac{1}{{}_N P_n}\right)$$

$$E(\overline{X}^2) = \sum_{\overline{x} \in \bigcup_{(a_{i_1},\cdots,a_{i_n}) \in P^n_*} \left\{\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}\right\}} \overline{x}^2 \cdot p_{\overline{x}} = \sum_{(a_{i_1},\cdots,a_{i_n}) \in P^n_*} \left\{\left(\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}\right)^2 \times \frac{1}{{}_N P_n}\right\}$$

$V(\overline{X})$

Start End

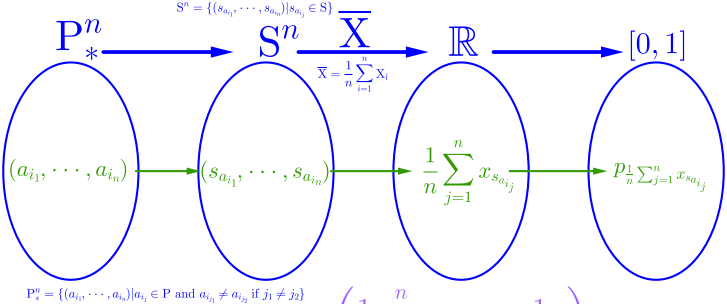


$$\mathrm{E}(\overline{\mathrm{X}}) = \sum_{\overline{x} \in \bigcup_{(a_{i_1},\cdots,a_{i_n}) \in \mathrm{P}^n_*} \left\{\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}\right\}} \overline{x} \cdot p_{\overline{x}} = \sum_{(a_{i_1}, \cdots, a_{i_n}) \in \mathrm{P}^n_*} \left(\frac{1}{n} \sum_{j=1}^{n} x_{s_{a_{i_j}}} \times \frac{1}{{}_N\mathrm{P}_n} \right)$$

$$\mathrm{E}(\overline{\mathrm{X}}^2) = \sum_{\overline{x} \in \bigcup_{(a_{i_1},\cdots,a_{i_n}) \in \mathrm{P}^n_*} \left\{\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}\right\}} \overline{x}^2 \cdot p_{\overline{x}} = \sum_{(a_{i_1}, \cdots, a_{i_n}) \in \mathrm{P}^n_*} \left\{ \left(\frac{1}{n} \sum_{j=1}^{n} x_{s_{a_{i_j}}} \right)^2 \times \frac{1}{{}_N\mathrm{P}_n} \right\}$$

$$\mathrm{V}(\overline{\mathrm{X}}) = \mathrm{E}(\overline{\mathrm{X}}^2) - \left\{\mathrm{E}(\overline{\mathrm{X}})\right\}^2$$

Start End

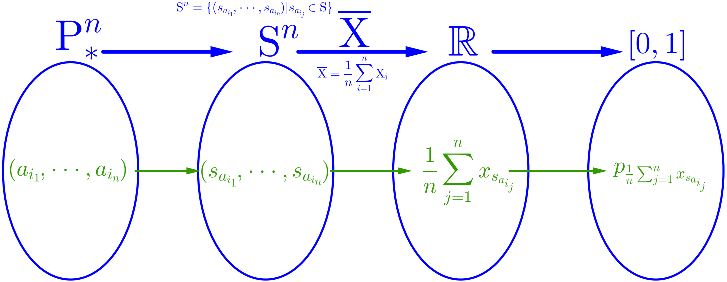


$$\mathrm{E}(\overline{\mathrm{X}}) = \sum_{\overline{x} \in \bigcup_{(a_{i_1},\cdots,a_{i_n}) \in \mathrm{P}^n_*} \left\{\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}\right\}} \overline{x} \cdot p_{\,\overline{x}} = \sum_{(a_{i_1},\cdots,a_{i_n}) \in \mathrm{P}^n_*} \left(\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}} \times \frac{1}{{}_N\mathrm{P}_n}\right)$$

$$\mathrm{E}(\overline{\mathrm{X}}^2) = \sum_{\overline{x} \in \bigcup_{(a_{i_1},\cdots,a_{i_n}) \in \mathrm{P}^n_*} \left\{\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}\right\}} \overline{x}^2 \cdot p_{\,\overline{x}} = \sum_{(a_{i_1},\cdots,a_{i_n}) \in \mathrm{P}^n_*} \left\{\left(\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}}\right)^2 \times \frac{1}{{}_N\mathrm{P}_n}\right\}$$

$$\mathrm{V}(\overline{\mathrm{X}}) = \mathrm{E}(\overline{\mathrm{X}}^2) - \left\{\mathrm{E}(\overline{\mathrm{X}})\right\}^2 \qquad \sigma(\overline{\mathrm{X}})$$

Start End



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$$\mathrm{E}(\overline{\mathrm{X}}^2) = \sum_{\overline{x} \in \bigcup_{(a_{i_1}, \cdots, a_{i_n}) \in \mathrm{P}^n_*} \left\{ \frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}} \right\}} \overline{x}^2 \cdot p_{\overline{x}} = \sum_{(a_{i_1}, \cdots, a_{i_n}) \in \mathrm{P}^n_*} \left\{ \left(\frac{1}{n}\sum_{j=1}^{n} x_{s_{a_{i_j}}} \right)^2 \times \frac{1}{{}_N\mathrm{P}_n} \right\}$$

$$\mathrm{V}(\overline{\mathrm{X}}) = \mathrm{E}(\overline{\mathrm{X}}^2) - \left\{\mathrm{E}(\overline{\mathrm{X}})\right\}^2 \qquad \sigma(\overline{\mathrm{X}}) = \sqrt{\mathrm{V}(\overline{\mathrm{X}})}$$

Github:
https://min7014.github.io/math20230621002.html

Click or paste URL into the URL search bar, and you can see a picture moving.