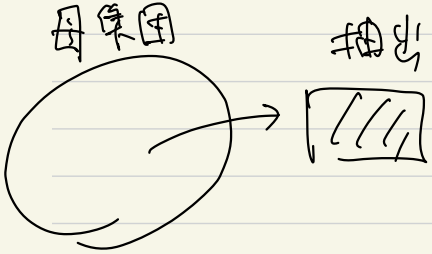
21 標本調査法

非復元抽出



$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

$$E[\bar{x}] = \mu$$

$$V[\bar{x}] = \frac{N-n}{N-1} \cdot \frac{1}{n} \cdot \sigma^2$$

有限修正

$$\frac{N-n}{N-1} \cdot \frac{\sigma^2}{n} \leqq C$$

$$\frac{\sigma^2}{C}N - \frac{\sigma^2}{C}n \leqq nN - n$$

$$\sigma^2 N \leqq n(CN - C + \sigma^2)$$

$$\frac{\sigma^2 N}{\sigma^2 + N(C-1)} \leqq n$$

例1

$$V[\bar{x}] = \frac{1600-100}{1600-1} \cdot \frac{1}{100} \cdot 120$$

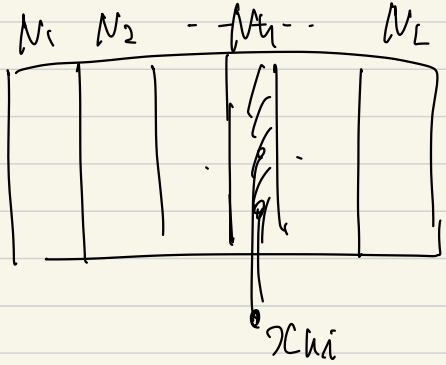
$$= 1.13$$

$$\frac{120^2 \cdot 1600}{120^2 + 1600 \cdot (-.05)} = 209.\cdots$$

209人

(4) 層化抽出法

計 N



$$\overline{x}_{st} = \sum_{h=1}^{L} \frac{N_h}{N} \cdot \frac{1}{n_h} \sum_{i=1}^{n_h} x_{hi}$$

標本分配法

① 比例分配法

② 等分配法

③ 不比例分配法

③散らばりの大きい層から大きい標本を抽出

例2 ① 比例 $\frac{500}{10000} \times 20 = 10$

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② $n_1 = \frac{500 \times 6 \times 1}{1 \times 500 \times 6 + 500 \times 10} \times 20$

$= \frac{1}{4} \times 20 = 5$

$n_2 = 15$

[1]

問題

問21.1 ②

問21.2 $\frac{f}{40} = \frac{300 + 1500 + 2550 + 5050}{40} = 235$

1200 7600 9400

[2] 天井

問21.3 [1] ②, ③

[3] $V_1 = \frac{95 - 600}{95 - 1} \cdot \frac{1}{600}$ [m/s]

$V_2 = \frac{1}{500}$ [m/s]