minimize $\sum_n a_n N_n^{-1}$ $\quad \sigma^2_{\mu_n} = a_n$ $\quad$ Marika

sbt $\quad \sum_n N_n - N_T = 0$

$$\mathcal{L} = \sum_n a_n N_n^{-1} + \lambda \left(\sum_n N_n - N_T\right)$$

$$\frac{\partial \mathcal{L}}{\partial N_n} = \frac{-a_n}{N_n^2} + \lambda = 0 \qquad \lambda = \frac{a_n}{N_n^2} \text{ for each } N_n$$

$$\sum_n N_n = N_T$$

$$N_n = \frac{\sqrt{a_n}}{\sqrt{\lambda}}$$

$$\sum_n \sqrt{\frac{a_n}{\lambda}} = N_T$$

$$\frac{\sum_n \sqrt{a_n}}{N_T} = \sqrt{\lambda}$$

$$N_n = \frac{\sqrt{a_n} \cdot N_T}{\sum_n \sqrt{a_n}}$$

minimize $\sum_n a_n N_n^{-1} \to \sum_n a_n \frac{\sum_{n'} \sqrt{a_{n'}}}{\sqrt{a_n}\, N_T}$

$$= \left(\sum \sqrt{a_n}\right)^2 \frac{1}{N_T}$$

~~this~~ it can be seen that this is the same