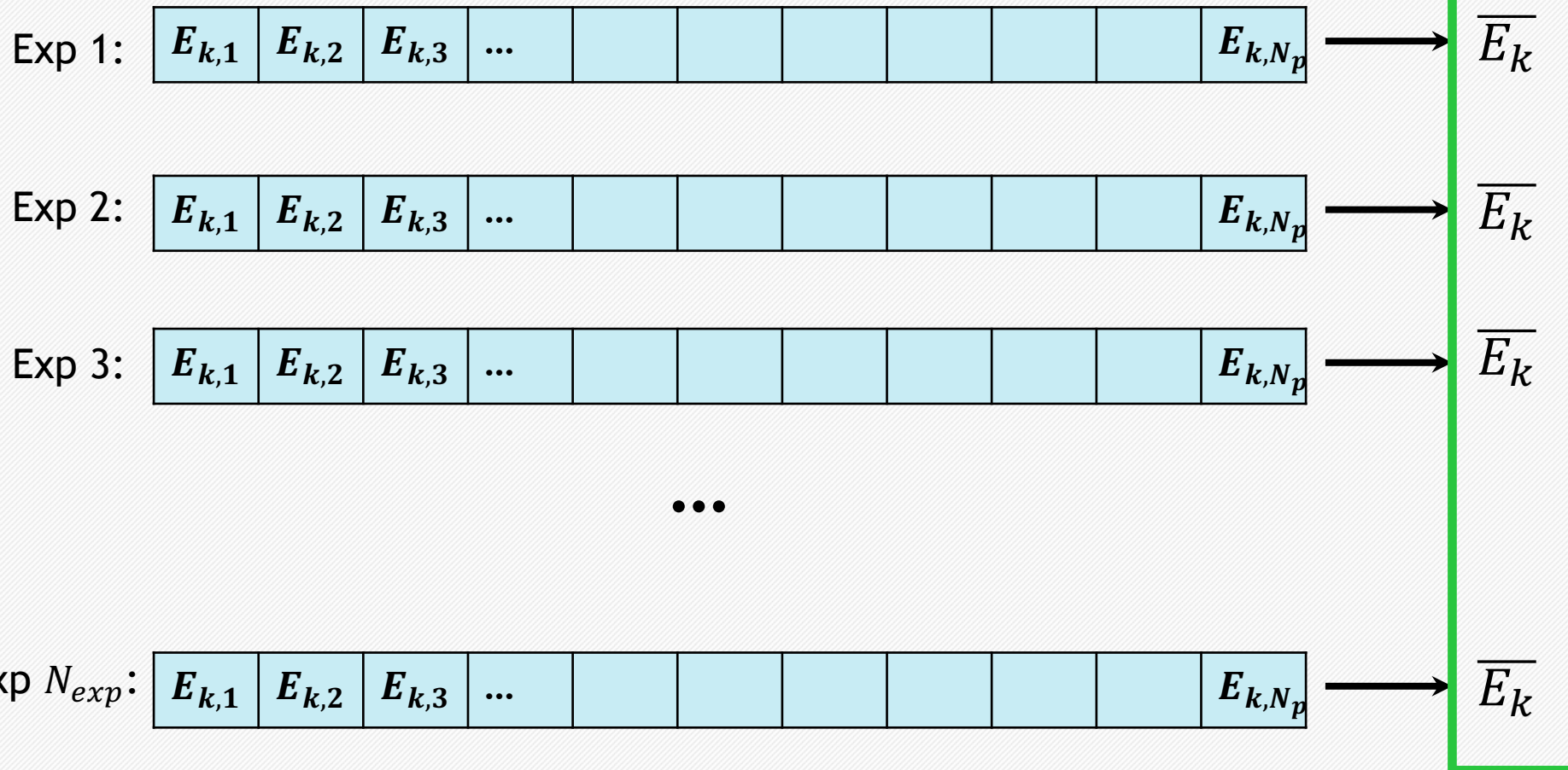


Statistical Methods in Physics-

Parts of answers for Exercise 7

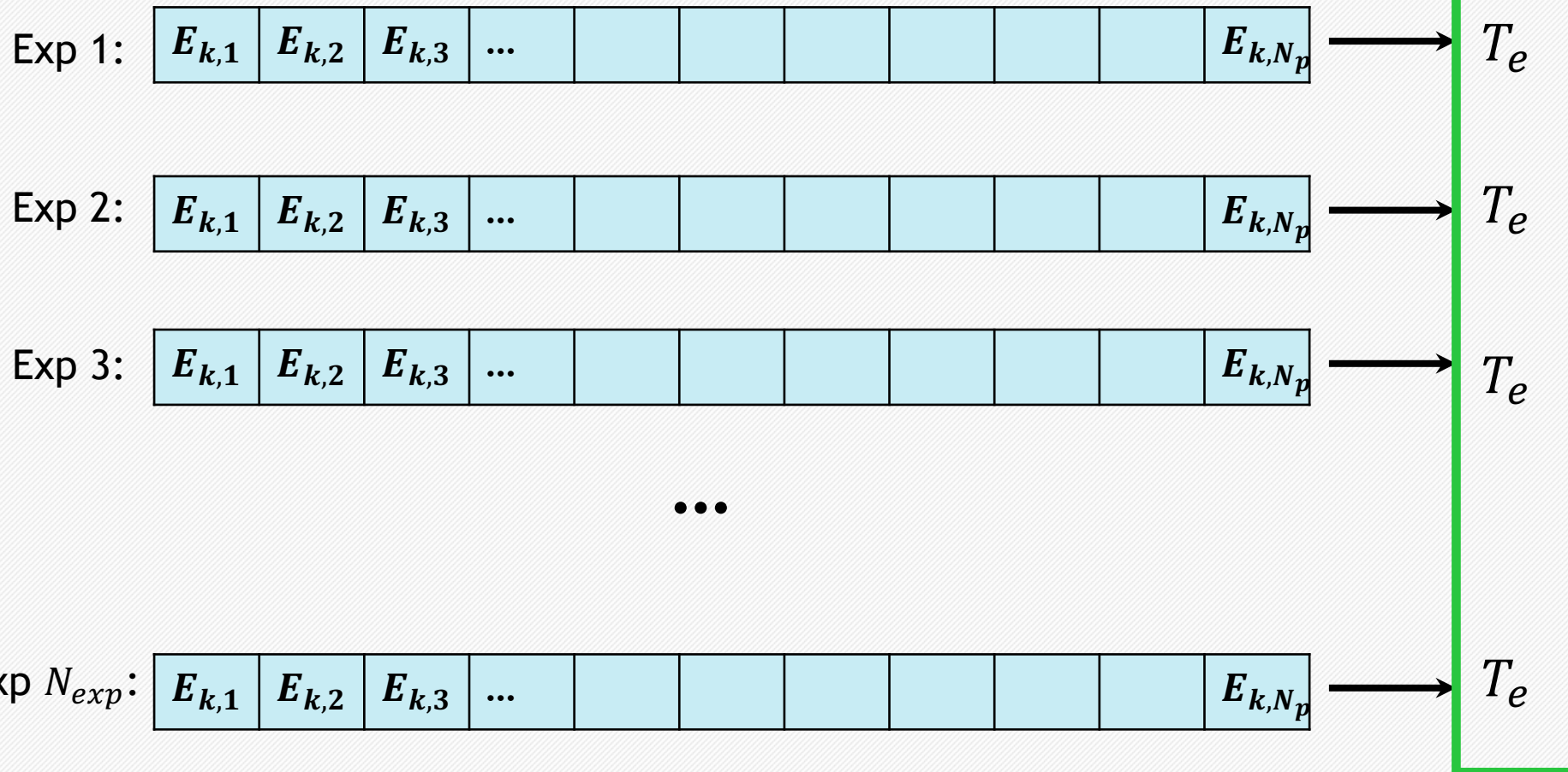
Hepeng Yao

Reminder in Exercise 5: CLT



Follow a Gaussian
With $\sigma' = \sigma / \sqrt{N_p}$

Question 7-4



With sufficient statistics,
they follow a Gaussian
 $\sigma = ?$

Question 7-5

From lecture notes, we know if the conditions on page 104 is satisfied, then from Eq. (9.2)

$$V(\hat{a} - a_0) = \frac{1}{A} \quad \text{and} \quad L = \gamma e^{\frac{A(\hat{a}-a)^2}{2}}$$

$$\rightarrow \ln L(\hat{a}) = \ln \gamma + \frac{A(\hat{a} - a)^2}{2} \quad \text{and} \quad \ln L(a) = \ln \gamma$$

$$\rightarrow \ln L(\hat{a}) - \ln L(a) = \frac{A(\hat{a} - a)^2}{2}$$

$$\rightarrow V(\hat{a} - a_0) = \frac{(\hat{a} - a)^2}{2[\ln L(\hat{a}) - \ln L(a)]} \quad \rightarrow \quad \sigma(\hat{a} - a_0) = \frac{(\hat{a} - a)}{\sqrt{2[\ln L(\hat{a}) - \ln L(a)]}}$$