

Assignment 5a: let  $n \in \mathbb{N}$ ,  $\lambda \in [0, \infty)$ ,  $X_n \sim \text{Binom}(n, \frac{\lambda}{n})$

$X \sim \text{Poisson}(\lambda)$ . Show that  $\lim_{n \rightarrow +\infty} P(X_n = k) = P(X = k)$

$$\forall k \in \mathbb{N}. \text{ Show that } |P(X_n = k) - P(X = k)| \underset{n \rightarrow +\infty}{\sim} \frac{k(k-1)}{n}$$

A fisherman fishes in a lake with contains 10 000 fishes. 9000 are of kind A and 1000 are of kind B. Let  $X$  be the number of kind B fishes fished by the fisherman in 100 try and releasing each fish after catching one.

Give  $P(X=10)$  the exact value. Give an approximated value using the first result. Comment with respect to second result.