

Theoretical Qualification Assignment for DeepBayes Summer School 2018 (deepbayes.ru)

1 Problem 1

The random variable ξ has Poisson distribution with the parameter λ . If $\xi = k$ we perform k Bernoulli trials with the probability of success p . Let us define the random variable η as the number of successful outcomes of Bernoulli trials. Prove that η has Poisson distribution with the parameter $p\lambda$.

2 Problem 2

A strict reviewer needs t_1 minutes to check assigned application to DeepBayes summer school, where t_1 has normal distribution with parameters $\mu_1 = 30$, $\sigma_1 = 10$. While a kind reviewer needs t_2 minutes to check an application, where t_2 has normal distribution with parameters $\mu_2 = 20$, $\sigma_2 = 5$. For each application the reviewer is randomly selected with 0.5 probability. Given that the time of review $t = 10$, calculate the conditional probability that the application was checked by a kind reviewer.