Domáca úloha č.4 - Výpočty a simulácie v jazyku R 3

Prosím odovzdať spustiteľný podrobne okomentovaný R-kód do 26.4.2018 20:00.

1

13. The time (in hours) until failure of a transistor is a random variable $T \sim \exp(1/100)$.

    (a). Find $\mathbb{P}(T > 10)$.

    (b). Find $\mathbb{P}(T > 100)$.

    (c). It is observed that after 90 hours the transistor is still working. Find the conditional probability that $T > 100$, that is, $\mathbb{P}(T > 100 \,|\, T > 90)$. How does this compare with part (a)? Explain this result.

2

15. An insurance company has received notification of five pending claims. Claim settlement will not be complete for at least one year. An actuary working for the company has been asked to determine the size of the reserve fund that should be set up to cover these claims. Claims are independent and exponentially distributed with mean \$2,000. The actuary recommends setting up a claim reserve of \$12,000. What is the probability that the total claims will exceed the reserve fund?

3

13. A survey of 900 people asked whether they play any competitive sport. In fact only 5% of the surveyed population plays a competitive sport.

    (a). Find the mean and standard deviation of the proportion of the sample who play competitive sport.

    (b). What sample size would be required to reduce the standard deviation of the sample proportion to one-half the value you found in (a)?

4

12. A course can cater for 200 new students. Not all offers to students are accepted, so 250 offers are made based on previous rejection rates. Assume that for this current round of offers the actual rejection rate is 35% and that students make their decisions independently.

    (a). State the distribution of N, the number of students who accept, and state its mean and standard deviation.

    (b). Find the approximate probability that less than 180 students accept.

    (c). Find the approximate probability that more than 200 students accept.

5 BONUS

Pomocou simulácií ukážte, že Monte Carlo konfidenčný interval "funguje".