Student: _____

Group: _____

Lecturer: A.S. Eremenko

HOMEWORK 8

1. If we refer to a single experiment which can have one of two possible outcomes such an experiment is so called:

1	

a) a Binomial;

b) a Bernoulli trial;

c) a random experiment;

d) a trial.

2. If RV X has a PDF $p_X(k) = P(X = k) = \binom{n}{k} p^k (1-p)^{n-k}$, $k = 0, 1, \dots, n$ this is:

1	

a) the normal RV;

b) the Poisson RV

c) the binomial RV;

d) the Bernoulli RV.

3. A population, composed with different sub-populations (more than 2), is observed. What type of distribution has the size of sub-population:

1	

a) the binomial distribution;

b) the Poisson distribution;

c) the multinomial distribution;

d) the Bernoulli distribution?

4. It is a good approximation for a binomial PMF with parameters n and p, provided $\lambda = np$, n is very large, and p is very small:

1	

a) the exponential PDF;

b) the Poisson PMF;

c) the multinomial PMF;

d) the Bernoulli PMF.

5. Sequence of moments of appearance of some homogeneous events in a time line is:

1	

a) a simplest flow of events

b) a flow of events;

c) a Bernoulli process;

d) a Poisson process.

6. An arrival process is called a Poisson process with rate λ if it has the following properties:

1	

a) small interval probabilities;

b) conditioning on event;

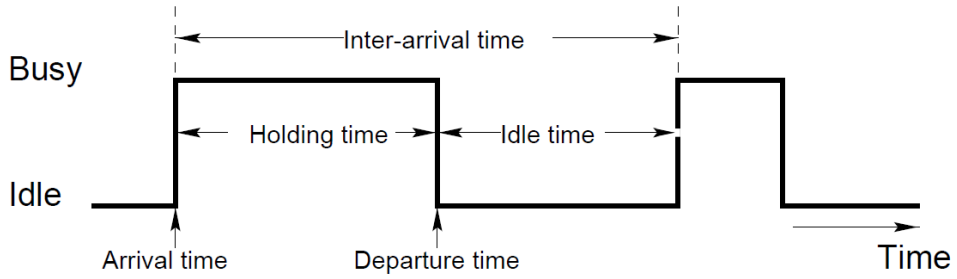
c) independence;

d) time-homogeneity.

7. What distribution has a random variable characterized inter-arrival time between calls (in PSTN line) if we know that arrival process of calls is Poisson? *Answer*:

Is it continuous or discrete? *Answer*:

2	



Problem 1. The number of packets arriving at a packet switch during the one-minute period of from 9:00 a.m. to 9:01 a.m. has been counted over 30 days. The total count is 42 million packets. What is the packet arrival rate during this period?

2	

Solution:

Problem 2. Consider packets arriving at a packet switch at the following arrival rate: $\lambda = 6 \cdot 10^6/min$. Assuming a Poisson arrival, what is the probability that three packets will arrive in a 10-μsec interval?

5	

Solution:

Problem 3. Assume a Poisson arrival with the arrival rate $\lambda = 100/\mu sec$. Find the probability that the **inter-arrival time** between consecutive arrivals is less than 0.01 μsec.

Solution:

5	

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