**The International College of Economics and Finance**

**Econometrics 2018-2019.**

**Class 1. The introductory test.**

**Choose the correct answer.**

1. An estimator, whose expected value is equal to the true value of the parameter, is called:

**(A)** consistent; **(B)** unbiased **(C)** efficient; **(D)** statistically significant;  **(E)** none of the above.

1. For some estimator it is known that its variance strictly decreases as the sample size increases. Such estimator is called

**(A)** unbiased; **(B)** asymptotically unbiased; **(C)** efficient; **(D)** consistent; (E) none of the above

1. Random variable has the following distribution:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | ‑2 | ‑1 | 0 | 1 | 2 |
| PX | 1/12 | 1/6 | 1/2 | 1/6 | 1/12 |

Indicate the incorrect statement:

**(A)** E [X] = 0; **(B)** var (X) = 1; **(C)** E [X3] = 0; **(D)** E [X2] = 2/3; **(E)** E [X5] = 0.

1. Indicate the correct statement(s) of the confidence interval for the mean constructed using a sample of *N* observations taken from the normal distribution with unknown mean and unknown standard deviation.

**i)** 99% confidence interval for the *N*=40 will be wider than 99% confidence interval for N=60;

**ii)** 95% confidence interval is wider than 99% confidence interval for the same *N*;

**iii)** to evaluate the width of the confidence interval the tables of standard normal distribution could be used;

**iv)** confidence interval could be obtained here by adding and subtracting the margin of error to (from) the theoretical mean of the normal distribution under consideration;

**v)** if standard deviation of the original distribution is known the resulting confidence interval would be wider for the same *N*;

**(A)** (i), (iii), and (v). **(B)** (ii), (iii) and (v). **(C)** (ii) and (iv). **(D)** (i) and (iv) **(E)** (i) only..

1. What is the probability of a Type II error when a hypothesis test is being conducted at the 5% significance level ()?

**(A)** 0.95. **(B)** 0.90. **(C)** 0.10 **(D)** 0.05. **(E)** There is not enough information to answer this question.

1. Consider a random variable *x* with an expected value of . For a sample of *n* observations, the formula  gives an unbiased estimator of , for  such that
2. for any .
3. .
4. .
5. .
6. .
7. The formula of an unbiased estimator of population covariance between random variables *x* and *y* for a sample of *n* observations is:

**(A)**  **(B)**  **(C)** 

**(D)** ; **(E)** none of the above

1. Which of the following is true for covariance?

**i)** If *y = v + w*, then *cov (x, y) = cov* (*x, v*) *+ cov* (*x, w*)*.*

**ii)** If *y = vw*, then *cov* (*x, y*) *= cov* (*x, v*) *cov* (*x, w*)*.*

**iii)** If *y = az*, where *a* is a constant, then *cov* (*x, y*) *= a cov* (*x, z*).

**iv)** If *y = az*, where *a* is a constant, then *cov* (*x, y*) *= a*2 *cov* (*x, z*).

**v)** If *y = a*, where *a* is a constant, then *cov* (*x, y*) = 0.

**(A)** (iii), and (v). **(B)** (i), (ii) (iv) and (v). **(C)** (i), (ii) and (iii). **(D)** (i) (iii) and (v) **(E)** (i), (ii) and (vi).

1. Which of the following is true for variance?

**(i)** if *y = v + w,* then *var* (*y*) *= var* (*v*) *+ var* (*w*)

**ii)** if *y = v + w,* then *var (y) = var (v) + var* (*w*) *+* 2*cov* (*v, w*)*.*

**iii)** if *y = az*, where *a* is a constant, then *var* (*y*) *= a*2*var* (*z*).

**iv)** if *y = a*, where *a* is a constant, then *var* (*y*) *= a*2.

**v)** if *y = v + a*, where *a* is a constant, then *var* (*y*) *= var* (*v*).

**(A)** (ii), (iii), (iv) and (vi).  **(B)** (ii) (iii) and (v). **(C)** (ii), (iv) and (v). **(D)** (i) and (iv) **(E)** (i), (iv) and (v).

1. Which of the following properties **DO NOT** hold for the expected value?

**i)** *E* (*x + y*) *= E* (*x*) *+ E* (*y*) for any random variables *x* and *y*

**ii)** *E*(*xy*) *= E*(*x*) *E*(*y*) for any random variables *x* and *y*

**iii)** *E* (*xy*) *= E*(*x*) *E*(*y*), if the random variables *x* and *y* are uncorrelated

**iv)** *E* (*xy*) *= E*(*x*) *E*(*y*), if the random variables *x* and *y* are independent

**v)** *E* (*x/y*) *= E*(*x*) */E*(*y*), for any random variables *x* and *y*

**vi)** *E* (*x/y*) *= E*(*x*) */E*(*y*), if the random variables *x* and *y* are uncorrelated

**vii)** *E* (*x/y*) *= E*(*x*) */E*(*y*), if the random variables *x* and *y* are independent

**(A)** (ii) and (v). **(A)** (i), (ii) and (v). **(D)** (ii), (iii), and (v). **(E)** (ii), (v) and (vi). **(C)** (ii), (v), (vi) and (vii).

1. A correlation coefficient for the per capita money income and the savings rate in Russia is calculated. Then, all the variables are expressed in US dollars at the current exchange rate and the same correlation coefficient is calculated again. The value of this coefficient will change:
2. In proportion equal to the square of the dollar / rouble exchange rate;
3. In proportion equal to the square of the rouble / dollar exchange rate;
4. In proportion equal to the dollar / rouble exchange rate;
5. In proportion equal to the rouble / dollar exchange rate;
6. Will not change.
7.  means that,
8. For any positive  and  the probability that, in a large enough sample,  differs from  by less than  will be smaller than .
9. For any positive  and  the probability that, in a large enough sample,  differs from  by more than  will be smaller than .
10. For any positive  and  the probability that  differs from  by more than  will be smaller than for any sample size.
11. For any positive  and  the probability that  differs from  by less than  will be smaller than for any sample size.
12. none of the above.