

Пример вопросов к экзамену

----- Exam Questions 1 -----

***** Problem 1 *****

In a sample, the following distribution of genotypes was obtained:

AA	AB	BB
302	167	31

Questions:

- * What is the frequency of 'B' allele?
- * What is the distribution expected under HWE?
- * Compute the chi-square test for HWE
- * Is deviation from HWE significant?

***** Problem 2 *****

Design: case-control

Data:

	Factor Absent	Factor Present
Control	298	76
Case	86	40

Questions:

- * Characterize the strength of association between the disease and the risk factor
- * Compute the value of score test for association in this data
- * Is association significant? (use p-value < 0.05 as significance threshold)

***** Problem 3 *****

Data:

	Trait	Genotype
1	5.2	1
2	6.0	1
3	4.5	0
4	5.6	0
5	4.4	0
6	6.1	2
7	4.9	1
8	5.9	0
9	6.1	2
10	5.2	0

Questions:

- * What is the variance of the trait?
- * What is the variance of the genotype?
- * What is covariance between the trait and the genotype?

- * What is the coefficient of regression of the trait onto genotype?
- * What is correlation between the trait and the genotype?
- * Compute the score test for association between the trait and the genotype
- * Is association significant (use p-value < 0.05 to claim significance)?

***** Problem 4 *****

Data:

	beta	se
Study 1	0.85	0.37
Study 2	0.49	0.34
Study 3	0.30	0.37

Questions:

- * Is association significant in any individual study? Which ones?
- * Perform meta-analysis. What is the value of meta-analysis beta?
- * What is the value of meta-analysis se?
- * What is the value of meta-analysis test statistic?
- * Is association significant in meta-analysis ($p < 0.05$)?

ОТВЕТЫ

----- Answers 1 -----

***** Problem 1 *****

Frequency of 'B' allele is 0.229
 Expected distribution is 297.2205 176.559 26.2205
 Test value = 1.465599
 No significant deviation from HWE

***** Problem 2 *****

Odds Ratio = 1.823745
 Score test statistics = 6.904763
 Association IS significant at $p=0.05$

***** Problem 3 *****

Variance of the trait: 0.4187778
 Variance of the genotype: 0.6777778
 Covariance: 0.3077778
 Regression T onto G: 0.734943
 Correlation: 0.5776992
 T2: 3.337364
 Association is NOT significant at $p=0.05$

***** Problem 4 *****

There is significant association in study(es) Study 1
 Beta: 0.5433877
 SE 0.207347
 T2: 6.867902
 Association IS significant at $p=0.05$