Department of Economics

Statistical Methods for Finance

Homework n.2
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Exercise 1
- Compute the density function of a bivariate Gaussian random variable for a given distribution value and for three different sets of parameters.

Exercise 2
- Draw a random sample with $n = 1000$ from a bivariate Gaussian distribution with a given set of parameters.
- Compute the mean and the variance-covariance matrix and verify that the empirical values correspond to the theoretical ones.
- Repeat the above exercises considering $n = 10000$ units. What can we observe when the sample size increases?

Exercise 3
- Draw a sample with $n = 100$ from a Bernoulli and a Gaussian distribution (choosing appropriately the parameter values). Provide a graphical representation of the corresponding likelihood and log-likelihood functions and identify (graphically) where the maxima lie.

Exercise 4 The file "redimenti.txt" provides information about some "risky" and "less risky" portfolios.

- Test the null hypothesis that the mean portfolio return is equal to 0, against the alternative hypothesis that it is lower, at a significance level of 0.05.
- Test the null hypothesis that the mean portfolio return for the "risky" group is equal to that of the "less risky" one, against the

alternative hypothesis that they are different, at a significance level of 0.001 (assuming known and equal variances).

– Test the null hypothesis that the variances of the two portfolio returns are equal, against the alternative hypothesis that the variance of portfolio returns in the "risky" group is different than that in the "less risky" group, at a significance level of 0.01.