

STATISTICAL METHODS IN FINANCE REVISION CHECKLIST

The following items constitute the fundamentals of what should be known for the module *Statistical Methods in Finance*, for the MSc in Mathematics and Finance, 2019-2020.

- Finance terminology encountered in the course.
- Visual exploration of data.
- Given two samples $X = (x_1, \dots, x_n)$ and $Y = (y_1, y_n)$, definition and intuitive meaning of $\mathbb{E}(X)$, $\mathbb{V}(X)$, $\text{Cov}(X, Y)$ and $\text{Corr}(X, Y)$.
- Convergence of random variables.
- Meaning and use of Principal Component Analysis.
- Hypothesis testing.
- Basics of linear algebra: definition and properties of the trace and the determinant.
- In the framework of linear regression, definition of the maximum likelihood function and of the maximum likelihood estimator.
- Definition of method of moments estimator.
- Definition of a confidence interval for an estimator.
- Hypothesis testing: differences between single and composite tests, level and power of a test.
- Distributions to know: Uniform, Bernoulli, Binomial, Gaussian, Exponential.
- Cochran's theorem.
- Definition and properties of orthogonal projection matrices.
- Quadratic Risk.
- Gaussian linear regression analysis.

DEPARTMENT OF MATHEMATICS, IMPERIAL COLLEGE LONDON

E-mail address: a.jacquier@imperial.ac.uk