

School of Mathematics - JAE 2017

**Enlargement of filtration and predictable representation property:  
application to Financial Mathematics**

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Bernardo D'Auria

Department of Statistics, Universidad Carlos III de Madrid and ICMAT

## Abstract

The field of mathematical finance has undergone a remarkable development since the seminal papers by F. Black and M. Scholes [8] and R. Merton [9], in which the famous *Black-Scholes Option Pricing Formula* was derived. In order to determine the value of a contingent claim or the best strategy to construct an optimal portfolio, it is important to model the amount of information that it is known and how to value it. The main tool at disposal for this task is the concept of Enlargement of Filtration and this course will give a short introduction to it.

## Index

- Predictable Representation Property and Girsanov's Theorem
- Basic Concepts and Examples in Finance
- Enlargement of Filtrations - Initial Enlargement
- Enlargement of Filtrations - Progressive Enlargement
- Optimal portfolio with insider information

## References

### Main textbook

- [1] M. Jeanblanc, M. Yor and M. Chesney. *Mathematical methods for financial markets*. Springer, London, 2009.

### Additional textbooks

- [2] J. Cox and M. Rubinstein. *Options Markets*. Prentice-Hall. Englewood Cliffs., 1991.
- [3] F. Delbaen and W. Schachermayer. *The Mathematics of Arbitrage*. Springer, Berlin, 2005.

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- [5] D. Revuz and M. Yor. *Continuous Martingales and Brownian Motion*. Springer Verlag, Berlin (3rd ed.), 1999.
- [6] M. Yor. *Some Aspects of Brownian Motion, Part II: Some Recent Martingale Problems*. Lectures in Mathematics. ETH Zürich. Birkhäuser, Basel, 1997.

## Review articles

- [7] J. Azéma. *Quelques applications de la théorie générale des processus, I*. Invent. Math., 18:293–336, 1972.
- [8] F. Black and M. Scholes. *The pricing of options and corporate liabilities*. Journal of Political Economy, 81:637–654, 1973.
- [9] R. Merton. *Theory of Rational Option Pricing*. Bell Journal of Economics and Management Science 4(1): 141–183, 1973.
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- [12] Ph. Protter. *A partial introduction to financial asset pricing theory*. Stochastic Processes and their Appl., 91:169–204, 2001.
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