CQF January 2009
Module 2.4
Live Class: February 17
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Martingales I: Advanced Stochastic Calculus and Martingales

In this lecture:

We expand on the stochastic calculus lecture (Lecture 1.3)
- to introduce further probabilistic methods:
- the probabilistic universe;
- sample space,
- Filtration and probability measures;
- conditional and unconditional expectation;
- change of measure and the Radon Nicodym derivative;
- definition and properties of martingales.

Summary:

- The probability space (Ω;F; P) is the space where stochastic processes live;
- The expectation is an integration with respect to the probability measure P;
- The conditional expectation has a number of important properties, i.e. linearity, Tower, "taking out what is known," independence, positivity and Jensen's inequality;
- The Radon Nicodym Theorem is useful result to help us change our setting from a measure P to a measure Q;
- Martingales are driftless processes;
- Brownian motion can be defined in terms of martingales;
- Itô integrals are martingales and that martingales can be represented as Itô integrals.