Master in Mathematical Finance

Interest Rate and Credit Risk Models

Exam – 1 February 2017

Time: 2:15h

Group I (8,0)

Please describe how to:

1. assess financial market participants' expectations from option prices. (2,5)
2. estimate a risk-neutral density function with non-parametric methodologies (also identifying the pros and cons of these methodologies). (3,0)
3. compute the probability of default for a company from its stock price. (2,5)

Group II (6,0)

How can one argue that:

1. in a Wiener process, the uncertainty is proportional to time? (1,5)
2. the Geometric Brownian Motion hypothesis is relevant for the distribution of a financial asset price? (2,5)
3. an asset is riskier when its pay-off is negatively correlated to the stochastic discount factor (2,0)

Group III (6,0)

1. Please comment on the trade-off between CIR and Vasicek interest rate models (2,5)

2. Please describe a 2-factor Gaussian affine model for the term structure of interest rates, presenting the equations for the yield curve, the short-term rate, the volatility curve and the term premium (3,5)