Derivative Pricing – an Overview

[Nematrian website page: DerivativePricing, © Nematrian 2015]

The Nematrian website provides users with a range of algorithms that they can use to price and hedge derivative instruments.

There are, of course, many different types of derivative, many different types of instruments that might be used for hedging purposes, many different pricing models and many different ways of implementing such models in a timely and efficient manner.

Moreover, as is explained in Kemp (2009), it is well known by most practitioners in these markets that formulae typically used to derive pricing and hedging parameters (such as the Black-Scholes formulae) generally rely on a number of unrealistic assumptions that do not represent market reality. Despite this, such models are still widely used, principally as a price quotation convention rather than because market practitioners believe that they closely approximate reality. By this we mean that the relevant formulae are being used to derive from the observed market prices of one or more instruments some market implied values for one or more input parameters to our pricing models, which we then use to price 'similar' instrument for which no directly observable market price is available. Thus practical derivative pricing also involves *calibration* of the model, i.e. identifying value(s) that these input parameter(s) need to take for the derivative prices to match actual observed market price(s).

We are therefore expecting this part of the Nematrian website to grow significantly through time as instrument, model and calibration approach and other algorithm coverage is developed.

Examples of material already covered in the Nematrian website include:

- Option pricing 'greeks' for some instrument types in a Black-Scholes world
- Derivation of the Black-Scholes Option Pricing Formulae using the limit of a suitably constructed lattice
- Derivation of the Black-Scholes Option Pricing Formulae using Ito (stochastic) calculus and partial differential equations
- Material describing Semi-Analytic Lattice Integrator Approaches to derivative pricing
- Nematrian derivative pricing web functions

If you spot any errors in this material please contact us to advise us of the error.