PROBABILITY AND STATISTICS SEMINARS

11 am, Friday 27th August 2004
M345 (Building 28)

Convergence of the Binomial Option Price to the Black-Scholes Price

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Abstract 1

If W has mean 0 and variance $\sigma^2 > 0$, we say that W^* has > 0, we say that W^* has the W zero biased distribution if

$$\text{mean}[Wf(W)] = \sigma^2 \text{mean} f'(W^*) \text{ for all } f.$$

Zero biasing has been used to study normal approximations in various situations. The discrete version of zero bias ing can be defined as follows. For an integer-valued random variable W with mean μ and variance σ^2, we say that W^z has the W zero biased distribution if

$$\text{mean}[(W-\mu)f(W)] = \sigma^2 \text{mean}\Delta f(W^z) \text{ for all } f \text{ on all integers.}$$

To approximate the distribution of such a W, a discrete approximating distribution is preferred since the error of the approximation is measuredby the total variation distance rather than the Kolmogorov-Smirnoff distance. In this talk, I will explain how to use the discrete zero biasing and Stein's method to find an integer-valued random variable which provides the central limit theorem for the sum of independent integer-valued randomvariables in the same way as normal distribution does. This is a joint work with Larry Goldstein.

Abstract 2

It is well-known that the binomial option price converges to the Black-Scholes price as the number of periods tends to infinity. However, in general, the convergence is not smooth. In this talk, which is based on work by my student Chang Lobin, it is shown how to adjust the parameters in the binomial model in order to ensure smooth convergence.

Convenor: Aidan Sudbury (aidan.sudbury@sci.monash.edu.au).