1056-Z1-1094 **Daniel D. Sheng*** (danieldsheng@gmail.com), Senior Class, Westwood High School, 12400 Mellow Meadow Drive, Austin, TX 78750, and **Myles D. Baker** (Myles_Baker@baylor.edu), Department of Mathematics, Baylor University, One Bear Place, Waco, TX 767987328. *When uniformity must be replaced by non-uniformity: on finite difference approximations of the Black-Scholes equation on non-uniform grids.* Preliminary report.

The Black-Scholes equation has been utilized for modeling option pricing extensively. In a steady situation, the equation can be solved by using finite difference schemes on uniform grids. When the volatility of a financial market creates unpredictable irregularities, however, the uniform numerical methods may lose their accuracy. Non-uniform grids must be introduced to overcome such a loss. This talk will focus on the consistency of the explicit, implicit and leapfrog finite difference schemes for solving the Black-Scholes model on non-uniform grids since the consistency ensures the basic reliability of the underlying approximations. Taylor expansions will be used throughout our analysis. Truncation errors will be derived and discussed. We will show that, when proper temporal and variable spatial derivative approximations, such as the D2 formula, are chosen, the non-uniform algorithms provide satisfactory results for today's turbulent financial market. Numerical experiments via MATLAB programs will be given to illustrate our conclusions. (Received September 20, 2009)