The application of the methodology (R/S) of the fractal theory, for determining the Hurst coefficient reveal the possibility of long memory behavior in one of the variables representative of Mexican market. Although the theorical results under certain tests may be not be statistically significant.

Since fractional brownian motion (FBM), which is a more general stochastic process traditional brownian motion that can model one process with antipersistence or persistence characteristics. Based on this process and using more general mathematical basis follows a more general valuation of European options (plain vanilla) and the Black-Scholes equation, the equation of bonds and the term structure Vasicek model, useful cases where the financial series show memory behavior. These models are applied to the case of a Mexican stock market index (IPC) and the results are interesting.

Also it has proposed modeling volatility as stochastic process consisting of a fractional Brownian motion. With the implementation of the H-J-B method raises the Black-Scholes equation with stochastic volatility for fractional brownian motion and proposes a kind of solution to the problem. It also discusses the behavior of the implied volatility of European options and Mexican market volatility index (VIMEX) for series with persistence characteristics for the IPC.