Non stationarity of high order return distribution moments

and their Irrational fractional Brownian Motion modelling

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This paper reports results on the forecast of the numerical value of the fat tail(s) exponent, kurtosis, and skewness of asset price distributions obtained from stock market indices, moreover simulated using the Irrational Fractional Brownian Motion (IFBM) model. An auto regressive analysis advances the understanding of the modelling and forecasting the returns distributions moments, whence provides some logical argument for the detailed shape of returns distributions and accurate measurement of Value at Risk.

The methodology uses a moving time interval width procedure, going beyond a standard consideration about the evolution of IFBM parameters for a time interval divided into 2 years wide windows. In so doing, we search whether there is non stationarity effect due to the width of windows, investigating what is going on from small to large windows. Thus, we are looking for some “convergence”, - somewhat washing out outliers. We have also examined whether statistical characteristics measured and simulated values depend on the time origin. The various forecasting values are discussed.