



Figure 1: Visual comparison between the VIX and the expected standard deviation. We have applied a linear scaling function.

Looking at the graph we can be quite happy with the result. The estimate catches the peaks well although it tends to overshoot a bit on some of them. The problem of estimator smoothness has been solved and the way in which the estimated standard deviation mimics the VIX when there is low volatility in the market is satisfactory.

7 Conclusion and Future Developments

In this paper we applied Gibbs Sampling to the problem of estimating the parameters of a Markov Switching Model. Although most papers model the data using a Normal distribution we decided to use α -stable distributions in order to model the fat tails that financial data exhibit. We got around the problem of not having a closed form of the density of an α -stable distribution by representing it as a conditionally Normal distribution. This form was sufficient for the Gibbs Sampling approach since it utilizes conditional distributions for sampling.

Regarding future developments there are multiple ways to improve the model. The main point of interest are the transition probabilities, which in this model are in their simplest form. Using transition probabilities that depend on multiple past states, that depend on the length of time the data has been in a certain state or that depend on other observable variables are all things that should be tried in order to make this model more accurate and robust.

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