

In this paper, a level set analysis is proposed which aims to analyze the S&P 500 return with a certain magnitude. It is found that the process of large jumps/drops of return tend to have negative serial correlation, and volatility clustering phenomenon can be easily seen. Then, a nonparametric analysis is performed and new patterns are discovered. An ARCH model is constructed based on the patterns we discovered and it is capable of manifesting the volatility skew in option pricing. A comparison of our model with the GARCH(1,1) model is carried out. The explanation of the validity on our model through prospect theory is provided, and, as a novelty, we linked the volatility skew phenomenon to the prospect theory in behavioral finance.