**Baseline Model Description**

Based on the literature, three phases can be distinguished for the evolution of the change detection algorithm:

* The base model with the power martingale and the Nearest Neighbor strangeness function
* The base function with a change detection capability
* The implementation of plug-in martingale

Accordingly, the baseline model was chosen to be the base exchangeability detection with the power martingale and the Nearest Neighbor strangeness function.

The following can be stated about the model:

1. **The Data:**

To have a better understanding of the model performance the baseline algorithm was applied to four set of data: (i) the raw data to be consistent with the approach pursued in the literature, (ii) iid white noise with shift in variance at the middle of the time series to serve as a benchmark to the model performance, (iii) normalized data by the standard deviation and (iv) a one-step difference filtered data to eliminate long memory components in the data that may affect the exchangeability assumption

1. **The strangeness measure:**

Since there is no classification in the data, a k-mean approach was adapted. In this case, the whole data was attributed to one cluster and the strangeness was considered as a function of the distance between the observation data and the cluster mean. For this purpose, the value alpha was chosen to be the ratio between the observation Euclidian norm and the norm of the data mean plus one standard deviation distance measure. The selection of one standard deviation is arbitrary and can be tuned based on the problem

1. **Power martingale:**

A randomized confidence transducer was used to generate the p-values to be used in a power martingale. A simple mixture of the power martingale was applied to eliminate the factor of the power parameter. The limit of the integration for the mixture integral was [0.001 0.999]

1. **General Observation:**

The power martingale approach was capable to capture the shift in the data variance for the simulated data. Also, the normalized data, exhibiting some features, is a convenient pre-processed data to be considered for the analysis