The Delay vector variance (DVV) method uses predictability of the signal in phase space to characterize the time series. The signal flow within the DVV method is illustrated in Figure 1. Using the surrogate data methodology, so called DVV plots and DVV scatter diagrams can be generated using the DVV method, as a test statistic, to examine the determinism/stochastisity and linearity/nonlinearity within a signal simultaneously. In DVV scatter diagram, the target variance values of the original signal is plotted against the averaged variance values, calculated over a number of iAAFT surrogates. As a result, for linear signals, the scatter diagram coincides with the bisector line and conversely for nonlinear signals, the scatter diagram deviates from bisector line as shown in Figure 2. The DVV method has been successfully applied to analyse the nature of biometric signals (EEG and fMRI).

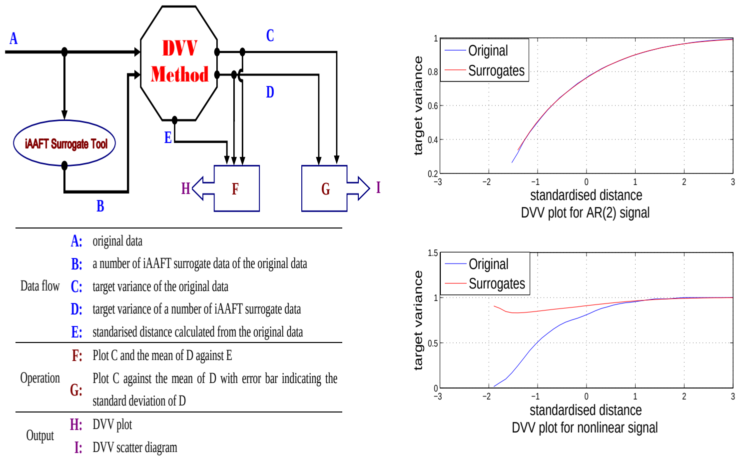
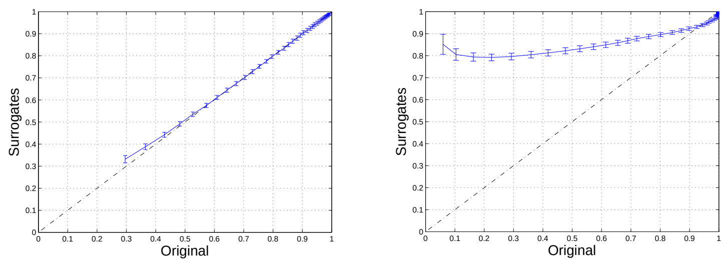


Figure 1: DVV Method: DVV block diagram (left) and DVV plots for linear and nonlinear signals (right)



(a) DVV scatter diagram for linear AR(2) signal

(b) DVV scatter diagram for nonlinear signal

Figure 2: DVV scatter plots: AR(2) signal (left) and nonlinear henon signal (right)

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