1. Generate\_ensemble()

Ensemble = generate\_ensemble(choice);

Choice is an integer = 1,2,3

1. Unipolar
2. Polar NRZ
3. Polar RZ

Ensemble is a 2D array no. Rows = no. Realizations and no. Columns = no. samples

1. Get\_statistical\_mean()

Mean = get\_statistical\_mean(ensemble);

Mean is a 1D array where each value corresponds to the mean value of X(t) sampled at that sample.

1. Get\_autocorrelation()

[autocorrelation,autocorrelation\_average] = get\_autocorrelation(ensemble)

Autocorrelation is a 2D array where each row represents different t1 values and the columns are the values of the autocorrelation function at a certain time shift tau

Note that tau is mapped to have only positive values since matlab doesn’t allow zero or negative indexing so tau ahs values from -max\_tau to max\_tau these values are then all shifted by + max\_tau +1 to keep all indeces positive.

Max\_tau = number\_of\_samples - 1;

For the number of samples being 700, max\_tau = 699 since this is the maximum shift from any t1, all values that are shifted out of bounds are set as zero in the autocorrelation function, meaning that if t1 = 500 and tau is at 300 then the resultant t2 = t1 + tau = 800 which is out of the bounds of the ensemble so the autocorrelation(500,800) = 0.

Autocorrelation\_average is a 1D array that has the average value of all autocorrelations at all different t1 values, to have a single autocorrelation function from which the PSD can be calculated.