

Figure 5: System Response of Adaptive Filter

Above figure represents the system response of the designed LMS adaptive filter. As from the above simulation results we observed that most of the echo components are from the signal. It is not possible to remove the echo completely from the signal, since the echo signal is additive in nature.

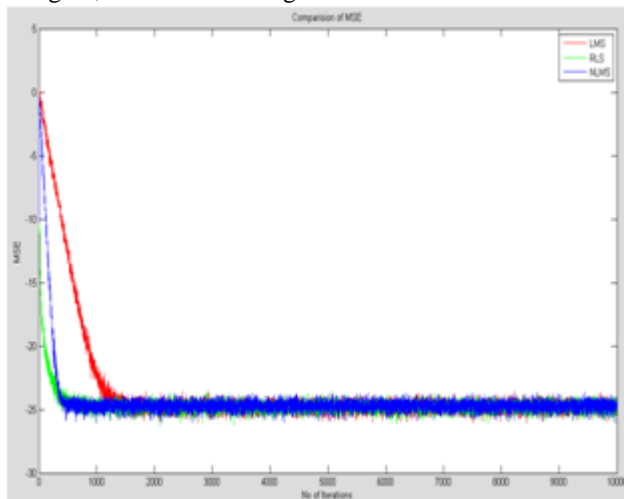


Figure 6: Comparison of Adaptive Filters

Above figure represents the comparison of three advanced adaptive filters as LMS, NLMS and RLS.

These parameters describes the dynamic nature of the filters and it is defined as the number of iterations needed to come stable MSE i.e. steady state MSE and it is also known as Mean asymptotic square error or MASE. This concerns how fast the algorithm will change the filter parameters to their final values.

As already discussed in previous sections the LMS adaptive filter has the stable step size irrespective of input signal and where as the NLMS has normalized step size, which is normalized by using input signal power. Both these filters are limited with input signal power and do not have the knowledge of previous samples. But these limitations are overcome by the concept of RLS. In RLS the step size varies as per input signal power and therefore there is less MSE when compared to previous which is proved in simulation

results. Therefore the RLS algorithm is best suitable in terms of MSE and LMS is preferable in terms of less complexity.

10. Conclusion

From the analysis of simulation results, LMS algorithm is most suitable in terms of low complexity for known power signals and RLS is most suitable for dynamic natured signals. But the RLS algorithm faces high complexity and the LMS faces high MSE. RLS algorithm is used for high quality applications. NLMS is suitable for intermediate signals. However the usage of adaptive filters depends on priority of echo cancellation

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