Development of a New Adaptive Beam-Forming Technique for Smart Antenna System

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Abstract

Smart antenna is one of the most efficient innovations for maximum interference mitigation, improved tracking of signal of interest and coverage. A systematic implementation of a new beam-forming algorithm technique for smart antenna system has been developed which entails combining linear random antenna configuration with fast transversal recursive least square algorithm (FTRLSD), the linear random antenna are obtained by the use of the non uniform fast Fourier transform .This new adaptive beam-forming technique was compared with similar algorithms such as least mean square (LMS) and recursive least square (RLS) algorithms. Simulation results shows that this combination is better for beam-forming towards the desired user, also offers better interference suppression since it has the smallest minimum square error of about 1.0*10-2compared to the least mean square algorithm that has minimum square error of 3.6*10-2and the recursive least square that gave minimum square error of 3.5*10-2 , good tracking performance compared to other algorithms such as the least mean square (LMS) and recursive least square (RLS) algorithms since it produced the most narrow beam towards the signal of interest. It converges after 10 considering 1000 snapshots while the least mean square
and the recursive least square algorithms converge after 40 and 50 considering 1000 snapshots respectively hence it have higher speed of convergence.

References

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