Department of Electrical Engineering
Indian Institute of Technology, Madras

EE 6110: Adaptive Signal Processing

November 16, 2021   **Mini-Project Topics**   Marks: 40 or 50

For the mini-project, choose one of the algorithms given below. The measurement model is the same as given in Assignment #2. As done there, you have to compute and plot the convergence curve corresponding to the algorithm that you have chosen, by using Monte Carlo simulations. The corresponding $10\log10(\xi(k))$ versus k is to be marked in "solid blue" colour, while the J_{min} line can be in "solid-red" color as in Assignment #2.

Specify salient points about the parameter values(s) you considered for this "chosen" algorithm. What is the simulated EMSE for the same?

Choice of Algorithms

1. Any adaptive algorithm of your choice (if your own, provide proper justification!)

Please see pp. 183-184 in E-copy of Sayed's book for 2. thro 8.
2. ε-NLMS with power normalisation
3. Sign-error LMS
4. Leaky LMS
5. Least Mean Fourth (LMF)
6. Least Mean Mixed Norm (LMMN)
7. Affine Projection (APA and ε-APA) – pg. 192
8. Partial Rank Algorithm (PRA and APA) – pg.197
Variable Step-Size (VSS) Algorithms (see scanned page on URL from A.Sayed's book pg. 255)
9. VSS – LMS
10. RVS – LMS
11. KVS – LMS
12. VSS – NLMS
13. Gauss-Newton algorithm (pg. 256-257 in E-copy) – similar to RLS

Blind Algorithms
14. Sato Algorithm (see Haykin 4th Edition)

Constant Modulus Algorithm & Godard Algorithm
15. CMA(1,2) and NCMA – see pp.188 in E-copy for 15. and 16.
16. CMA(2,2)
17. CMA(1,1) – see Haykin 4th Ed for 17. and 18.
18. CMA(2,1)

19. Reduced Constellation Algorithm (RCA) – pp.187
20. Multi Modulus Algorithm (MMA) – pp. 188
21. Stop & Go Algo. (Picchi & Pratti, T-Comm, 1987 – see reference in E-Copy p-768)
22. Benvenisti & Goursat Algorithm (T-Comm, 1984 – see reference in E-Copy p-759)

Please submit your choice of algorithm to the TA, Mr. Gokularam (gokularam@tenet.res.in) before Saturday 5.00pm, Nov. 20, 2021. If any change is required, we will get back to you.