

Design APA family model for interface canceling problem

Speech with noise - $d(n)$

Vacuum cleaner - $n(n)$

To Try :

- Either take a vacuum cleaner as input. The speech with noise as desired response.
- Or vice versa
- Start with NLMS

Data:

- 2 input $d(n)$ and $n(n)$ with the sampling frequency of 21Khz

Project Requirement: *IEEE Transaction on Signal Processing*

- Report must include experimental procedures and the data to conclude your result
 - Intro to theory
 - Description of the methods
 - Present the results
 - Conclude
- Papers must have an ability to be replicated
- Reference the material you have used online.

Min Req in the report :

- Start with 2 tap filter
- Plot surface contours
- Plot the weight tracks
- Plot the learning curve - interpret it
- [Frequency response from the desired signal to the error when the filter is adapted](#)
- SNR improvement = $10\log(E[d^2]/E[e^2])$
- Show variation in performance with increase in filter order. Using analysis determine which filter order you choose
 - Estimate the frequency response from the desired signal to the error
 - Is ERLE a good figure of merit?
 - Filter performance as a function of step-size
 - Find the misadjustment
 - Analyze and explain the results achieved, and discuss the problems with adaptation and convergence of the algorithm in a non-stationary environment.

Repeat the same with another APA Algo - APA 2/APA 1. Explain what improvement you might expect from choosing the APA algo and verify it by comparing the performance/computation trade off against the NLMS.