

Normalised LMS Algorithm - Interference Cancelling, Project 1

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[scale=0.25]image5.jpg

Fig. 1. 3D Performance Surface plot

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REFERENCES

Abstract—This papers gives a detailed report on how the problem statement for the project has been handled, with the assumptions and the learnings. The problem statement is an application of Normalized LMS algorithm to remove the noise from an audio signal. The problem also states that the input signal is 21KHz. We are to design and evaluate the performance of an adaptive FIR filter using the NLMS algorithm. This is also considered as an inference cancelling problem.

- [1] B. Widrow et al., "Adaptive noise cancelling: Principles and applications," in Proceedings of the IEEE, vol. 63, no. 12, pp. 1692-1716, Dec. 1975. doi: 10.1109/PROC.1975.10036
- [2] P. Howells, "Intermediate frequency side-lobe canceller," U S . Patent 3 202 990, Aug. 24, 1965
- [3] B. Widrow and M. Hoff, Jr., "Adaptive switching circuits," in IRE WESCON Conv. Rec., pt. 4, pp. 96-104, 1960.
- [4] N. Nilsson, Learning Machines. New York: McGraw-Hill, 1965

I. INTRODUCTION

Noise cancelling is an important

Wiener solutions explains methods, when the reference input is free of signal noise in the primary input can be cancelled without any or very less signal distortion[1]. There are various applications for adaptive noise cancelling in the industry, some of them include cancelling interference in the ECG, speech signal, broad-band interference in an antenna array [1]. The paper [1] also talks about the design of the filter to be used. We can use a fixed filter for this problem of noise cancelling if we have prior knowledge of both the signal and the noise. But adaptive filters will adjust their own parameters automatically, without prior knowledge of the signal or noise. One famous commercial application of adaptive filtering is the MODEM for digital communication, which are widely used in connecting computers through the internet with less interference.

II. LITERATURE REVIEW

The earliest works in noise cancelling for Adaptive filters were "P. Howells, Intermediate frequency side-lobe canceller"[2], "B. Widrow & M. Hoff Adaptive Switching circuits" [3], "N. Nilsson, Learning Machines" [4]. Widrow and Hoff talk about an adaptive algorithm and pattern recognition scheme called the "Adaline" - short for "Adaptive Linear Threshold Logic Element" [3].

III. ADAPTIVE FILTERING

The basic model for adaptive filtering is shown in figure ??

IV. CONCLUSION

The conclusion goes here.