ISSN: 2278 – 7798
International Journal of Science, Engineering and Technology Research (IJSETR)
Volume 2, Issue 2, February 2013

A Survey Report for Design of FIR Filter with different method

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Abstract

Digital filter provide an important role in world of communication and computation. The main aim of Designing a digital finite impulse response (FIR) filter is to provided the better solution which satisfying all the conditions for the practical application and researcher design different techniques for reduction of noise from signal and improved the efficiency of the signal. All these technique have their merits and demerits. This proposed paper discussion various techniques proposed earlier in literature for noise reduction from signal. This paper also provides. Comparative study of various filters proposed by researches for noise reduction from signal.

I. INTRODUTION

Filter eliminate the harmful constituent from signal. The unwanted factor is generate the noise in signal so the system could not work in properly and don't cater accurate information of the system.filter is filtering these noise signal and generate a noise less signal these noise less signal is provide accurate information of the system. A different- different digital filters are used in many fields like that communication, image area, medical area etc. These digital filter furnish the more accuracy and improve the result of signal. There are Several methods available for the design of filters. These include the adaptive approach , constrained optimization approach , semi definite programming (SDP) approach, and least approach . In this paper we study the merits and demerits of different approach.

II. LITERATURE REVIEW

There are various of advanced techniques have been introduce for the design of FIR digital filters.

Hui Zhao and Juebang Yu design neural network-based digital filter. To understand this technique researcher select a continuous hopfield neural network (CHNN), researcher also used neural network based filter equation. in this study researcher also provide the relation between MSE criterion and the Lyapunov function. For better result as compare to the other technique , the researcher given few linear phase FIR design examples between the NNO design approach with some conventional design techniques, and the researcher finally proved that Neural Network Optimization (NNO) technique based filter provide better result. It is shown that the design results compare favorably with those obtained by using previous neural-based technique. The proposed technique have the advantages of high computational efficiency and suitable for hardware implementation for the real-time processing purpose.[1]

Wu-Sheng Lu design a equiripple FIR filter, based on the sequential quadratic programming (SQP) algorithms. Through the research, the researcher proved that

sequential quadratic programming based FIR filter have low group delay. Filter design by using sequential quadratic programming (SQP), the degree of flatness varies with the length of filter. In this research the researcher take three example with different parameters and proved that algorithm's performance. Researcher used MATLAB toolkit functions for implementation of proposed algorithm Because of its simplicity, it can be written in computer code very easily.[2]

In this research, the Arojit Roychowdhury prepare a report for designing a FIR filter with different technique for example frequency sampling method and the windowing method , the selection of the method is depend upon the advantages and disadvantages of the related filters , the main aim of the selection of the filter design is to reduce the error and improve the response. In this report the researcher also explain other technique for filter design for example Weighted Chebyshev Approximation **,** Nonlinear equation solution for maximal ripple FIR filters, Polynomial interpolation solution for maximal ripple FIR filters etc.[3]

The Xiaohua Wang design a neural network optimization based FIR filter, for understanding the merits of the design filter, the researcher took different design example and prove that when increasing the values of the weight coefficients for ω on the pass-band- and stop-band-edge, we can control the overshoot phenomenon that may happen near the pass-band and stop-band edge of the designed filter and reduce the error. Therefore, the proposed technique can achieve the least computation required. The proposed technique has the advantages of high computational efficiency[4]
Modified Particle Swarm Optimization (MPSO) algorithms are widely recognized to be among the most successful algorithms for general constrained optimization. In this research, the researcher attempts to develop Modified Particle Swarm Optimization (MPSO) based FIR filters with low delay, and researcher prove that gradient based optimization techniques are not effective for designing filter. In order to reduce error the different optimization technique for FIR filter design were presented wherein the remaining frequency samples are chosen to satisfy an optimization criterion, the main advantage of the Modified Particle Swarm Optimization (MPSO) algorithms is sharper transition band responses of the filter. according to the researcher Modified Particle Swarm Optimization is a global stochastic searching technique that can find out the global optima of the problem. This method can control the overshoot phenomenon that may happen near the pass-band and stop-band edge of the designed filter. Filter design by using Modified Particle Swarm Optimization (MPSO), the degree of flatness varies with the length of filter.[5]

Lo-Chyuan Su, Yue-Dar Jou, Fu-Kun Chen describe a neural network implementation based technique for designing digital filters in our research. To demonstrate the feasibility of the Neural network design approach, a model is chosen based on the Hpofield neural network. The researcher proved that with comparisons between Bhattacharya and least-squares (LS) method and our proposed method The computational requirement (i.e., MFLOPS) and the required number of neurons for our technique is significantly smaller than that of the Bhattacharya method. Therefore, not only the computational complexity of the proposed neural architecture, but the hardware cost also can be greatly reduced.[6]

S. M. Shamsul Alam design a digital finite impulse response (FIR) filter using different

method and generate different curves and finally compared with ideal response curve . Author design a FIR filter using Remez exchange algorithm author used Blackman window method, Frequency sampling method and Optimal method. It is shown that the response curve of FIR filter depend on the width of transition band. The proposed technique has the advantages of high computational efficiency [7]

Ricardo A. Losada gives the information about FIR filter design and fixed-point implementation. The Focuses is mostly on low pass filters, but many of the results apply to other filter The author focuses on practical aspects of filter design and implementation, and on the advantages and disadvantages of the different design algorithms[8]

Sheenu Thapar design Low pass FIR filter using artificial neural network. The author used genetic algorithms for designing the filter and proved that the artificial neural network (ANN) optimized with genetic algorithms.(GA) is meeting the performance goal in just seven iterations. In our research the author compared the proposed approach with Kaiser window method and proved that , not only the computational complexity of the proposed neural architecture, but the hardware cost also can be greatly reduced [9]

Yong Ching Lim presented a novel fast convergent weighted least squares algorithm for quasi-equiripple FIR and IIR filter designs. For deriving the weighted squares frequency response a novel iterative algorithm used by author. The author proved that the designed filter have better response and algorithm converges at a speed several times faster than the commonly used Lawson's algorithm.[10]

Graham C. Goodvin and Kwai Sang Sin works on removing of the problem of adaptive filtering, prediction and control involve some form of parameter estimation. The least squares algorithm is used for design of filter and this algorithm is widely used and is generally believed to have much faster convergence than other algorithms. However it appears that convergence is much harder to establish for least squares based algorithms than for other algorithms such as stochastic approximation. In fact, in some cases, the convergence analysis indicates that the basic least squares algorithm should be modified to guarantee global convergence.[11]

V. Ralph Algazi design Finite duration filters using least-square method , author provided some to new theoretical results and to mathematically and practical design techniques for conventional and nonconventional filters, filter designed by author based on the weighted least square design of finite duration continuous filter in one dimensional and two dimensional . Designed algorithm is developed to control the overshoot phenomenon that may happen near the pass-band and stop-band edge of the designed filter, This algorithm converges at a speed several times faster than the commonly used algorithm. Because of its simplicity, it can be written in computer code very easily. the authors with the methods presented in this paper show them to be quite attractive in image processing.[12]

Nasir Mahmood Asif performed experimental simulation of speech with and without noise to solve the filtering problem , author design FIR digital filter was first designed to tilter the noise using DSP filter design tool box in Matlab The simulation results verify that the filter worked satisfactorily. The experimental results clearly verify and prove that use of neural

networks can produce more robust and powerful separation of speech and noise than other traditional algorithms.[13]

David hermann design a Prototype filter for highly oversampled,complex modulated filter bank. The main aim of designing this type of filter is to remove the delay which create the problam in specially audio application. This method provide a simplicity for designing a wide range of prototype filter bank.. Author compare the results with other methods. with design FIR filter using different methods. [14]

III. FUTURE ENHANCEMENT AND CONCLUSION

There are various techniques generated for designing of FIR filters. Every method has its own merits and demerit. For example design linear-phase FIR filters by a novel weighted BP neural networks algorithm has Some limitation it is not involved in operation of inverse matrix and the window method is also have some limitations like they are not very suitable for designing of filters with any given frequency response. The future work is develop a technique suitable for designing of filters with a given magnitude response and reduce the noise of signal.

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