

ABSTRACT

Echo phenomenon usually appear in nature, also can be happen in voice telecommunication network. Which could decreasing voice QoS value. Echo causes by hybrid impedance mis'match, when built connections 2-wire at local loop to 4-wire at central, which known as Circuit echo. Implementation use Echo Cancellation method to make echo disappear.

Adaptive filter use FIR filter structure as basic to built echo cancellation. Filter coefficient adapted by NLMS algorithm which able to decrease gradient noise from algorithm LMS. Echo in hybrid, models by delay and attenuation (3.5dB), then convoluted with input signal. Adaptive filter build by convolutioning input signal with weight which limited by N (taps filter value), to produce estimation echo. Hybrid echo signal subtract with echo estimation signal, if both of the signal have a same value, then it will produce output free from echo. But if the subtraction of those signal produce the remainder then it'll built error signal. The error signal use as a component to produce new weight at the NLMS adaptive algorithm. The new weights are use to update filter adaptive coefficient. Which aim to minimize the average of MSE. While TMS320VC33 is DSP (Digital Signal Processor's) Card which has operation velocity 13,34 ns to execute one instruction, so there's probability for the system to operate as a real time system and minimize the delay effect.

After examine the implementation of echo cancellation at TMS320VC33, then resulting *step size* (μ) value optimum at $\mu = 0.6$, when MSE value very minimum. Then time process reach 39.87 ms base on duty cycle calculation, for minimum taps filter in use. ERL value result 5.24 dB where the CCITT Rec G.131 standard, 6 ± 2.5 dB. Then ERLE value result 17.65 dB where the ERLE ITU-T G.168 standard, 20 dB. The result of the implementation echo cancellation in TMS320VC33 still in range of the standard parameter values.