TRADITIONAL SASANDO SOUND IN A MODERN WAY

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1. Introduction

Sasando is a traditional string music instrument which originates from Rote island of East Nusa Tenggara, Indonesia. The instrument is similar to a harp and is played the same way. The musical instrument is surrounded by a dried *Lontar* (*Borassus flabellifer*) leaf. The leaf functions as the resonator and amplifier for the instrument and is what makes the unique sound of the Sasando compared to a harp. The resonator is very spacious and fragile which makes less portable. An electric version of the *Sasando* was created. It uses an electric amplifier rather than the original resonator. Although it is more portable than its predecessor, it has lost the distinctive sound found on the traditional version. This dilemma leads to the purpose of this research, which is to combine the advantages of the two versions.

2. Research Method

This research was conducted by measuring the impulse and frequency response of the resonator trough firing sound impulses towards the inside part of the resonator and recording it using a microphone. The results awere averaged and cross correlated and analysed. From it, the time and the amplitude of the reverbs it produced could be known.

To measure the sound spectrum of each notation, a frequency sweep is fired at the resonator directly and recorded. Fast Fourier transform is used to convert from time domain to frequency domain. From the converted graph, the amplitude of each frequency can be known. How the resonator affects frequencies can be known by conducting a frequency sweep without any resonator and comparing them.

A filter can be created and used to affect the sound. Using the language JavaScript and the filter created, a module can be created that implements the distinguished sound. The amplitude of the filtered sound can be controlled by using a gain attribute. A server then can be created in order for the program to be accessed using the internet.

5. Results and Analysis

By examining Fig.1 and Fig.2, the difference between the two graphs can be seen. The resonator affects the higher notes which in this case is dampened.

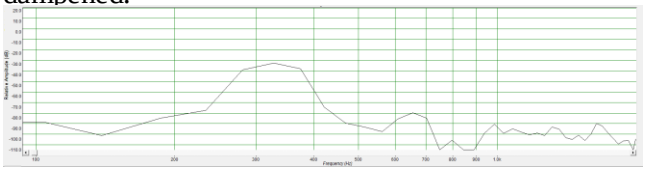

Fig.1, Sample result of frequency sweep without resonator.

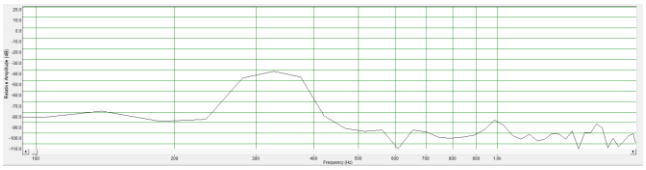

Fig.2, Sample result of frequency sweep with resonator.

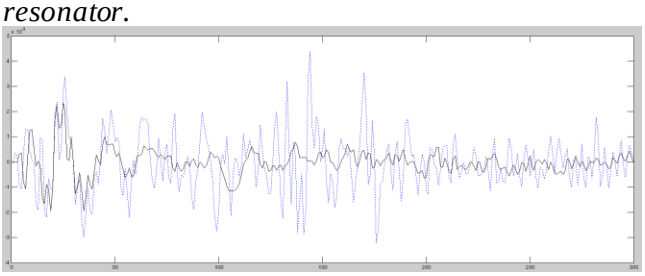

Fig.3, comparison between the result of impulse test witout resonator (black) and with resonator (dotted).

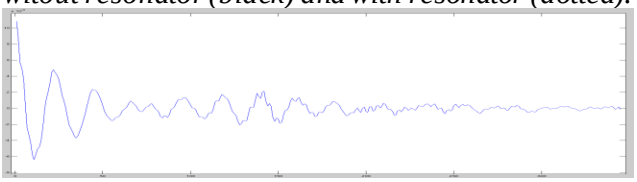

Fig.4, result of auto cross correlation of the signal.

From the result acquired (Fig.5), the lag and the strength of each reverb can be known. After knowing the characteristic of the resonator, a filter of be created.

6. Conclusion

The unique sound produced by the traditional Sasando is caused by the material, texture, and the shape of the leaf resonator. By using a filter, we can mimic the characteristics of the resonator. A program can be created to implement the filter on the electric instrument. Using the program, the Instrument can still be portable and have unique characteristics at the same time.

Refrences

[1] Steiglitz, Ken. *A Digital Signal Processing Primer*. Califoria : Addison-Wesley Publishing Company, Inc., 1995.

[2] Mella, Natalino. *Solo Tutorial Sasando*. Kupang : Sasando Shop., 2015.

[3] Boas, Mary L.. *Mathematical Methods in the Physical Sciences*. 2nd ed. Canada : John Wiley & Sons, Inc., 1983.

[4] Sethares, William A.. *Tuning, Timbre, Spectrum, Scale*. 2nd ed. London : Springer-Verlag London., 2005.