

## Time Frequency Analysis of Peking Gamelan

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### ABSTRACT

The tone of peking 1, 2, 3, 5, 6, 1' was investigated using time-frequency analysis (TFA). The frequencies were measured using PicoScope oscilloscope, Melda analyzer in Cubase version 9 and Adobe version 3. Three different approaches for time-frequency analysis were used: Fourier spectra (using PicoScope), spectromorphology (using Melda analyzer) and spectrograms (using Adobe). Fourier spectra only identify intensity-frequency within entire signals, while spectromorphology identify the changes of intensity-frequency spectrum at fixed time and Adobe spectrograms identify the frequency with time. PicoScope reading produces the spectra of the fundamental and overtone frequencies in the entire sound. These overtones are non-harmonic since they are non-integral multiples of the fundamental. The fundamental frequencies of peking 1, 2, 3, 5, 6 were 1066Hz (C6), 1178Hz (D6), 1342Hz (E6), 1599Hz (G6) and 1793Hz (A6) respectively while peking 1' was 2123Hz (C7) i.e. one octave higher than peking 1. Melda analyzer reading proved that all peking sustained the initial fundamental frequency and overtone at  $t=0$  until 2s. TFA from Adobe reading provides a description of the sound in the time-frequency plane. From TFA, peking 1, 2 and 6 exhibited a much gentler attack and more rapid decay than peking 3, 5 and 1'.

*Keywords:* FFT, fundamental, gamelan, overtones frequencies, peking

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### INTRODUCTION

Mantle Hood was one of the earliest pioneers of gamelan in the West that initiated gamelan performance study and understood the widest applications of gamelan (Sorrell, 1990). The measurements of scales and tunings were carried out in metallophones and xylophones found in Southeast Asia and on African xylophone with fixed tunings