

Abstract Submitted
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Spectrum and Frequency Analysis of the Cello Using Physical and Mathematical Transformations BUMJOON CHOI, RICHARD KYUNG, Choice Research Group — A sound spectrum is a reduced sample representation of the original frequencies of a sound, in terms of dB or Pascal. The spectrum shows the amount of energy concentrated in a given frequency band and displays the frequencies that are present in a sound. In this paper, the spectral aspects of Cello and other musical instruments are studied and compared by transforming the sound wave from time domain to frequency domain. The purpose of this research is to find and compare the vibrational characteristics, including the spectra of various selected musical instruments. A function that plots the spectrum for the Cello is built. Subsequently, the script to create the plots of the spectra for all other different instruments can be written. A computer program with sample sound files are used to carry out vibrational analysis and computational experiment for the Cello. The string instrument, including the Cello, shows strong peaks at the first and third harmonic components. Also, compared to the violin, the cello generates more pure tone. While the most of them generate a fuzzy tone, it shows that wood wind instruments show much more energy in the second and/or third harmonics than in the first frequency.

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